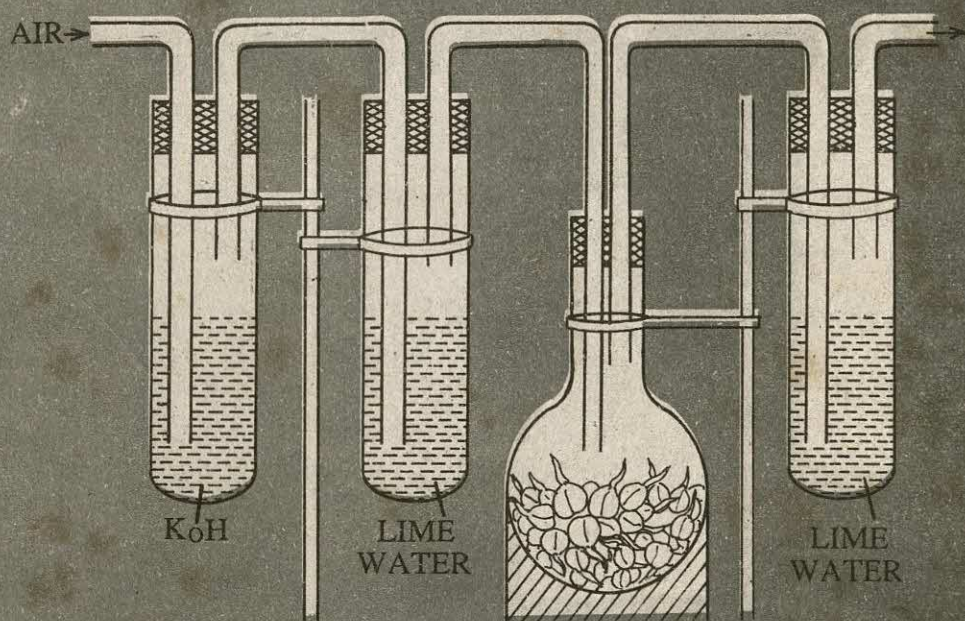


A SCHEME OF FORMATIVE EVALUATION IN SCIENCE CLASS VI



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

A Scheme of Formative Evaluation in Science

Class VI

Santosh Sharma



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

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FOREWORD

One of the most significant functions of evaluation is to provide feedback to both students and teachers for improving their performance. This is possible only when evaluation becomes an integral part of teaching-learning process and does not remain an end-of-course ritual.

Technically, evaluation starts when a child enters any formal course of study (entry assessment), continues throughout the duration of course (formative assessment), and achievement is certified at the end of the course (summative assessment). In summative evaluation it is presumed that all those who pass the final examination have achieved the expected level of competence. Formative evaluation, on the other hand, is basically utilized for the purpose of guidance and is built into the transaction of the curriculum. Formative evaluation, in fact, serves two important purposes of evaluation. First, it provides feedback to both teachers and students for improving the teaching and learning process. Secondly, it helps to evaluate those objectives which are not evaluated through written examinations conducted terminally.

If it is earnestly desired that the goals of Science Education include such objectives as the spirit of inquiry, appreciation, moral commitment to conscientious citizenship alongwith the mastery of subject matter, then, it is imperative that these are reflected in the teaching and testing programmes of schools. A wide range of tests and other evaluative devices such as checklists, rating scales, student's record, teacher's observation, etc., would also need to be pressed into service for evaluating diverse objectives of different domains.

The present volume entitled, 'A Scheme of Formative Evaluation' for Class VI science, provides suggestive tools and techniques that can be used by teachers for evaluating students' progress as also diagnosing their strong and weak points.

I congratulate Dr.(Km.) Santosh Sharma for her efforts in bringing out this document. It is hoped that its contents will be found useful both by teachers and students.

DR. K. GOPALAN
Director

National Council of Educational
Research and Training

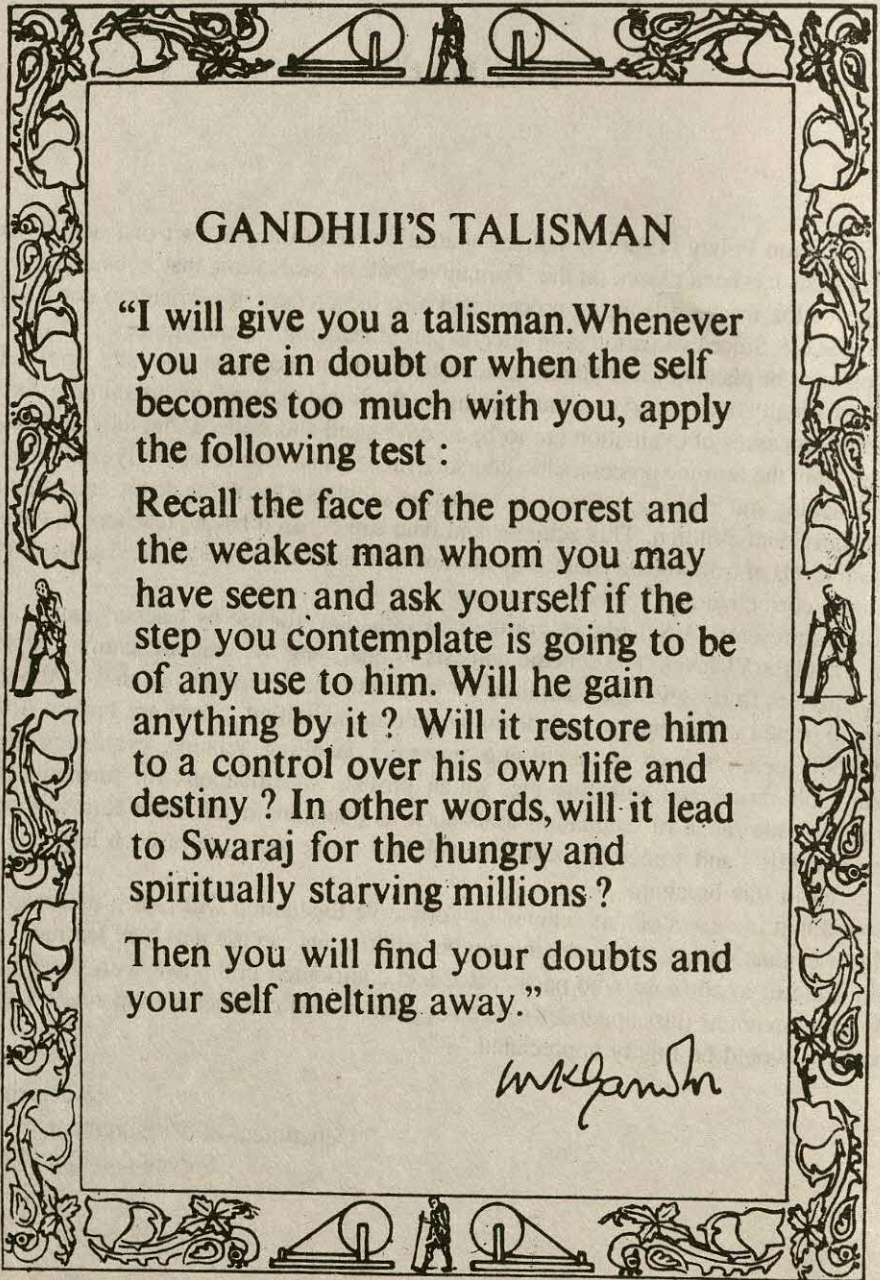
PREFACE

The New Education Policy (1986) visualizes evaluation as an integral part of teaching-learning process. Emphasis has been placed on the 'Formative' role of evaluation, that is, evaluation should help to improve the teaching-learning process and also the process of curriculum construction at the formative stage. Since evaluation is an integral part of teaching-learning process, the procedures of evaluation must be planned while planning the instructional methods and materials. The evaluation procedures are greatly determined by what learning methods and materials are used in the classroom. Materials and processes of evaluation are to be so developed and utilized that they are integral to and not apart from the learning processes in a course. Evaluation is made in relatively similar situations to those of teaching and learning. Formative evaluation supplies a lot of diagnostic and achievement data about individual children. This achievement data can be used by the teachers to ensure that the minimum levels of learning are attained by one and all children. The diagnostic data helps teachers to take timely corrective and remedial measures.

This volume presents 'A Scheme of Formative Evaluation' for use by teachers and students of science at the class VI level. The scheme consists in analysing the units of learning in terms of concepts/principles to be developed/acquired by students. The competencies, that is, the terminal behaviours expected at the end of each learning unit are identified. These are broken down into simpler tasks/behaviours such as identifying, grouping, labelling, relating, evaluating, inferring, generalizing, observing and selecting etc. which provide specifications for formative tests or procedures. A wide range of evaluation tools such as questions of different forms, observation schedules, checklists and student's record etc. relevant to the structure of each learning unit for task are given in this brochure.

It is hoped that the users of this scheme of Formative Evaluation will find it useful in relating the results of evaluation to teaching-learning process. Students can use it as 'self learning' package also. I am grateful to all those who participated and contributed in the two workshops organised to develop this material (last appended). The suggestions and comments from readers and users of this volume would be highly appreciated.

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Survey and Data Processing
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GANDHIJI'S TALISMAN

"I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test :

Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it ? Will it restore him to a control over his own life and destiny ? In other words, will it lead to Swaraj for the hungry and spiritually starving millions ?

Then you will find your doubts and your self melting away."

M.K. Gandhi

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INTRODUCTION

Till the recent past, evaluation has been entirely summative in nature. Summative evaluation takes place at the end of a course or semester, with the purpose of grading and certification. When summative evaluation is made more frequently, every few weeks or at the end of a chapter or unit of instruction, this is known as Intermediate Summative Evaluation. The Intermediate Summative Evaluation is concerned with more direct and less generalizable outcomes, whereas long term Summative Evaluation is concerned with the extent to which a student has realized the entire range of outcomes contained in a course. In summative evaluation the judgement is made after the learning has taken place and it is presumed that all those who pass the examination have achieved that defined level of competence. The scheme of Continuous Comprehensive Evaluation practised and advocated today in India is a form of Intermediate Summative Evaluation and Board/School annual examinations are a form of long term Summative Evaluation.

However, if evaluation is to aid both the teaching and learning processes, it must take place while the process of teaching and learning is still fluid and susceptible to modification. Formative evaluation intervenes during the formation stage, that is, when the process of teaching and learning is going on and not after it is completed. It serves two important purposes of evaluation. First, it points to the areas where corrective remedial measures are needed. Secondly it evaluates the process of learning. Formative evaluation thus provides feedback for both guiding teaching and learning and is an integral part of teaching-learning process.

Defining Objectives in Formative Evaluation

Defining objectives of learning in operational terms has been widely accepted as is evident from Ralph Tyler's study 'Eight-year Study of Secondary Education (1942)' on curriculum construction and Bloom's Taxonomy of Educational Objectives (1964). Tyler considered that the primary function of evaluation is to determine the extent to which students have or have not changed in relation to the set of desired behaviours. The emphasis in his approach was mainly summative that is how well the objectives had been obtained at the end of a course. Investigators like Gagne', Glaser, Stolurow and Mager were interested to know why a set of desired objectives have or have not been achieved, that is why an instructional programme worked or failed to work. They, therefore, evaluated each step of the instructional programme in relation to desired set of objectives. Such an approach would help to improve the instructional package in the development phase rather than pondering over its failure after the programme is completed. It is also difficult to make radical changes into a completed programme. Emphasis in this approach is, primarily on the formative evaluation, that is, the formation stage.

Gagne (1963) analysed a set of capabilities into prerequisite tasks which also are the building blocks of instructions. This technique known as task analysis, is illustrated in Fig.1 where Gagne has analysed an objective in mathematics into simpler components.

In task analysis, the competence/skill desired at the end of a unit of instruction is described and then analysed into component tasks or behaviours which must be sequentially built up to arrive at the terminal performance. Thus task analysis takes the "macro performance" and breaks it down into "micro behaviour components" which are the building blocks of instruction. Formative evaluation determines how well the students are assimilating these various intermediate components.

Task Analysis of an Objective in Mathematics

Adding Integers

Stating and using the definition of the sum of two integers, if at least one addend is a negative integer.

Stating and using the definition of addition of two positive integers.

Stating and using the definition of addition of an integer and its additive inverse.

Using the whole number '0' as the additive identity

Supplying other numerals for whole numbers, using the associative property

Supplying other numerals for whole numbers, using the commutative property

Identifying numerals for whole numbers employing the closure property

Performing addition and subtraction of whole number

Using parentheses to group names for the same whole numbers.

Thus, in Formative Evaluation, the terminal behaviour or competency is described first which is then analysed in 'micro' tasks or behaviours. These when sequentially arranged form the building blocks of instruction.

Classification of objectives: The objectives of learning have been classified by Bloom (1963) into three domains, namely, Cognitive Domain, Affective Domain and Psychomotor Domain. Cognitive behaviour objectives refer to remembering previously learned knowledge and being able to apply it to solve problems. Affective objectives refer to interests, attitudes and values. Psychomotor objectives refer to muscular and manipulative skills. For the purpose of teaching and evaluation, three domains i.e. cognitive, affective and psychomotor are taken together as a comprehensive 'whole'. Leopold E.Klopfer (1976) has developed the structural details of Bloom's three domains of taxonomy—Cognitive, Affective and Psychomotor, for Science Education. He has displayed the

range of instructional objectives encompassed by different science programmes. In the present scheme of Formative Evaluation, Leopold E. Klopfer's classification of objectives has been adopted as follows to make evaluation comprehensive.

1. *Scientific Products*
 - 1.1 Knowledge
 - 1.2 Comprehension
 - 1.3 Application
2. *Processes of Scientific Enquiry*
 - 2.1 Observing and measuring
 - 2.2 Seeing problems and seeking ways to solve it
 - 2.3 Interpreting data and formulating generalizations
 - 2.4 Testing and revising a theoretical model
3. *Manual skills*
 - 3.1 Skills in using common laboratory equipment
 - 3.2 Performance of common laboratory techniques
4. *Attitudes and Interests*
 - 4.1 Acceptance of scientific enquiry as way of thought
 - 4.2 Attitude towards social and moral implications of science
 - 4.3 Interest in reading scientific literature.

A specification grid where objectives are represented along with horizontal dimension, and content areas along the vertical dimension, shows which of these objectives can be achieved through which content areas.

Analysis of Learning Units: The learning unit can be a single lesson or learning session or the content that makes a meaningful whole. The learning units in formative and summative evaluation may or may not differ in the amount of content covered but differ in the purpose of evaluation. If the evaluation is performed to determine how well a student has assimilated the components of a unit, so that decision can be made on how instruction should best proceed, then it is formative in nature. However if the purpose of evaluation is simply grading or certification or assigning marks at the end of a unit, covering the same content area, then it is summative in nature. In formative evaluation, the unit is developed hierarchically from simple facts to complex concepts and principles. The column 'concepts', in this scheme includes facts, concepts and principles for the sake of convenience. In this hierarchy, facts are placed at the simplest level, these are information collected on the basis of observations.

Next is a concept, which is an idea generalized from particular and relevant experiences. Examples are electric current, acidity, cell volatile.

Then comes principles which are generalizations involving several related concepts. For example 'Metals expand when heated'. This statement has three concepts: metals, heat and expand. A theory is a broader set of related scientific principles.

Indicate what details have been explained, defined and illustrated for each concept/principle in the textbook. These concepts are then arranged in the ascending order of simple to complex. Strategies of developing concepts involve identification, grouping, labelling, relating, summarizing, evaluating, inferring and generalizing. The strategies of attaining a concept are observing, listening, comparing, selecting, stating and defining.

Tools of Evaluation: In the scheme of formative evaluation, every step of instructional programme has to be evaluated. Tools have been suggested to evaluate the process of collecting information, i.e. facts by observation and experimentation. Evaluation of intermediate steps in attaining and developing concepts and finally the skill of solving problems by applying appropriate principles has been suggested.

Since the goals of Science Education include such objectives as the spirit of inquiry, appreciation, moral commitment to conscientious citizenship alongwith the mastery of subject matter, these must also be evaluated in this scheme of formative evaluation. The formative evaluation aims at informing the student whether he has or has not mastered a given task and if he has not, indicate what steps should be taken to attain the desired competence. The teacher is, therefore, expected to point out the weak spots and to suggest the possible solutions to overcome these weaknesses. Taking this formative view of evaluation, the teacher may indicate his evaluation in terms of 'remarks', 'comments' and 'grades'. No rigid marking scheme has been suggested. Assigning of grades or classification of any kind is, however, not useful as a reinforcement in formative evaluation. If a student receives C or D grade on two or three subsequent occasions then he might develop a feeling that his achievement will remain C or D. But actually, this is the process of learning and his achievement at the end of process may be much higher.

The tools of evaluation illustrated in this scheme of formative evaluation include questions, student's record (observations), and teacher's observation (rating scale/checklist). The questions given in the scheme to evaluate each task/behaviour may be used in the form of class test (written/oral/open book) or as home assignment (open book). For problem-solving questions, students may be allowed to consult books and also for questions where collection of data or information from various sources is needed, relevant literature may be seen. Oral questions may be used where students are demonstrating to relate cause and effect or to explain the happenings in an experiment. Most of the objective type of questions can be used as class test (written, closed book). Field activities such as experimenting with plants, preparing working models etc. may be taken up as group or individual projects depending on the nature of activity. However, these details have been left to the teacher and he can modify and even develop his own tools/schemes depending on the instructional package, availability of time and other extraneous factors. This is only a sample scheme and institutional flexibility is allowed at all stages of its development.

Uses of formative evaluation: The purpose of formative evaluation is primarily to provide feedback and guidance to teachers and students. It informs a student where and what kind of corrective and remedial measures are needed. It also tells a teacher what kind of modification/reform is needed in his instructional package.

Feedback to students: Formative evaluation helps students in pacing their learning and also in

remedying the particular gaps in their learning of a specific unit. The learning also becomes scheduled avoiding overwhelming amount to be learnt before final summative evaluation. In formative evaluation, the entire learning sequence is broken down into smaller steps and each step of the sequential learning programme is evaluated. When the subject matter is sequentially arranged, a student is required to master pre-requisite concepts before learning principles or solving problems based on these concepts. Thus a student can know upto what level facts, rules, concepts, principles etc. he has reached and how much he has to learn in order to reach the desired goal. Also, mastery of pre-requisite units makes learning of later units easier.

Formative evaluation provides useful feedback to students by locating their difficulties. If a student knows which items he got right and which he got wrong on a formative test, he will have information about which ideas he still needs to learn or review.

This information can be made even more useful to the students, if an analysis of causes of his difficulties can be provided. Such an analysis may also include necessary steps/suggestions to overcome these difficulties. Some evidence is available (Airasion, 1968) to show that the lower items in a series have a necessary (but not sufficient) relation to the higher items in the series, that is, if a student makes an error on a lower item, it is unlikely that he will be able (except by chance or guessing) to answer a related higher item correctly. It also suggests that errors on the higher items (problem solving) are in part result of errors on the lower items (concepts, rules) of the series.

Errors/difficulties detected on formative tests can be corrected by suitable remedial measures. Teachers can provide special remedial materials such as clearer or simpler explanations, concrete illustrations, alternative simple instructional materials etc. to help the student overcome a particular difficulty. A set of cards can be developed, each card containing a formative test problem, discussion as to why certain answers are wrong and why a particular answer is correct and what can be the best answer. Other remedial measures include tutorial assistance and special group co-operation.

Feedback to teachers: An analysis of the errors made by students can be used to identify the facts, concepts, principles etc. with which the students are having difficulty. If majority of the students (say more than 60 per cent) have not mastered a particular concept then this may be regarded as inefficiency of the instructional material/instructional process. Teacher can attempt to reteach this particular concept using alternative instructional material and other techniques. Errors made by less than the majority of a class are errors to be corrected by the individual students. To remedy individual difficulties, students may seek teacher's help or co-operation of more able students. Formative evaluation can thus be used to modify the instructions.

Formative evaluation material may also be used for quality control purposes. If the course is similar in content and objectives, the teacher may compare the performance of one year to another.

All the students can achieve the desired objectives of learning if scheme of formative evaluation is appropriately used. When student is continuously evaluated and guided through formative evaluation scheme, there is no reason for his failure in the final summative evaluation.

Science in Everyday Life

S.No.	Concepts	Skills/Competencies	Specific tasks/behaviours	Tools of Evaluation
1	2	3		5
I.	Science helps in improving the living e.g. changes in types of houses, modes of travel, communication, entertainment etc.	<p>Pupils recognises the changes in modes of living e.g. changes in types of houses, modes of travel, communication, entertainment etc.</p> <p>Relates these changes to scientific and technological development.</p> <p>Recognises the application of man-made scientific instruments/tools in every day life.</p> <p>Appreciates the role of science in the prevention and cure of diseases.</p> <p>Shows willingness to receive more information on science.</p>	<p>Compares different types of houses that man has used from stone-age till today (technological age).</p> <p>Lists of different modes of travel.</p> <p>Lists different modes of communication.</p> <p>Illustrates how these changes in modes of travel and communication have helped to improve living.</p> <p>Illustrates and explains that these changes are a result of scientific innovations.</p> <p>Lists some common diseases.</p> <p>Explains the applications of science in prevention and cure of these diseases.</p> <p>Lists some applications of science from everyday life.</p>	Objective type (OT) and very short answer type (VSA) of questions
		Develops awareness about technological and scientific innovations by keep observation of biological and physical events.	Collects informations on science and scientific innovations from various sources e.g., newspapers, T.V. and radio etc. Keeps	Student Record

record of the new knowledge that he acquires about scientific innovations.

Observes objects and phenomena in everyday life and makes record of some of these.

Identifies one problem such as rusting of bicycle chain in rainy season, spoiling of food when kept overnight, 'selecting' proper conditions of soil for germinating seeds etc.

Solves the problem stated above using scientific method.

Suggests the probable causes of the problem started.

Formulates hypothesis.

Collects data.

Tests hypothesis.

Draws inference.

Lists constructive uses of science e.g. development of vaccines, improvement in methods of surgery, methods of growing food crops, abetting, facilities of drink-

Scientific method involves identification of problem, gathering information through observation and experimentation, formulating hypothesis, and generalization.

Observes biological and physical phenomena in life.

Identifies problems in everyday life situations.

Gathers information from various sources.

Devises small experiments.

Relates causes to effect.

Formulates hypotheses.

Tests hypotheses.

Infers results and draws conclusions.

Science can be appreciated that scientific discoveries and used for both inventions have helped to solve problems constructive and of food, health and shelter. destructive purposes.

Student's record of various steps to be followed in solving the problem.

Record of observations, data etc.

(VSA) Very short answer type of questions.

MCQs (Multiple Choice Questions).

True/false questions.

Student's record VSA Qs

1	2	3	4	5	
			ing water, industries, etc.	MCQs.	
			Lists destructive uses of science e.g., arms race, development of nuclear weapons that destroy life and people.		
			Compares the constructive and destructive uses of science.		
			Suggests ways of making science more useful in everyday life.		
			Describes sciences as a way of thinking and working.		
			Practices positive value system of science in everyday life.		
			Collects pictures etc. showing destructive uses of science.		
			Lists names of scientists, their countries and inventions made by them.		Matching type
			Illustrates how Indian scientists have helped the humanity.		Short Answer (SA) type
			Describes and illustrates the uses of discoveries and inventions made by Alexander Fleming, Madam Curie etc. (scientists of other countries) to Indian Society.		
			Recognises that development of science has led to deadly weapons which can destroy life and property.		
			Accepts science in its inter-relationship with society and people.		
			Develops a value system whereby science should only be used for constructive purposes.		
			Conceptualizes science as an enterprise organized to gain understanding of natural world.		
IV.	Science as a human activity is universal in nature.	Recalls the contributions of different scientists with a special reference to Indian scientists.	Recognizes that benefits of science do not remain confined to contributors alone.		

Concept I: Science helps in improving the quality of life

M.C.Qs

1. Which type of house protects you best from rain and fire?
 - A. Thatched huts
 - B. Tin roof house
 - C. Brick cement house
 - D. Brick mud house
2. The Railway Board from New Delhi issues a set of orders which must reach Madras immediately, but the officer to receive the message may or may not be present in his office. The orders should be conveyed by
 - A. personal carrier
 - B. telephone
 - C. telegram
 - D. telex
3. For which of the following diseases vaccine has not yet been developed?
 - A. Smallpox
 - B. Cholera
 - C. Plague
 - D. AIDS
4. Which of the following devices for cooking food would you recommend for a housewife living in rural areas of India?
 - A. Solar Cooker
 - B. Electric Pan
 - C. Cooking Gas
 - D. Burning Coal
5. Which of the following materials is used most in manufacturing cheap household goods, toys and machine parts?
 - A. Steel
 - B. Nylon
 - C. Aluminium
 - D. Plastic

Fill in the blanks

6. a) Invention of sewing-machine has helped us to stitch clothes _____ compared to hand stitching.
b) Invention of vaccines has helped us to control _____.

- c) Message sent by telegram reaches _____ than sent through a messenger.
 d) We can talk to a person at a far-away place using _____.
 e) We can see the events of Olympics alive _____.
 f) _____ has helped us to acquire new knowledge about things and happenings around us.
 g) Supersonic jet is the fastest mode of _____.
 h) _____ is a man-made fibre.
 i) Wires made up of _____ are used in electric circuits.
 j) To prevent growth of _____ mosquitoes we sprinkle on the sides of ponds and drains.

Matching Type

7. Match items in lists A and B.

- A**
- a) Tetanus
 - b) Barometer
 - c) Mosquitoes
 - d) Thermometer
 - e) Train
 - f) Aluminium
 - g) Pollution
 - h) Fertilizer
 - i) Radio
 - j) Solar Cooker

- B**
- i) Mode of travel
 - ii) Utensil
 - iii) Crops
 - iv) Sound Waves
 - v) Industrial/Wastes
 - vi) Sun
 - vii) ATS injection
 - viii) Malaria
 - ix) Temperature
 - x) Pressure

Very Short Answer

- 8. List five inventions/discoveries of science which have helped us in improving the quality of life.
- 9. List five modes of travel starting from ancient to recent.
- 10. Name five diseases for which vaccine is available now.

Short Answer

- 11. Illustrate how science has helped us to know and understand people of other countries.
- 12. Explain how science is helpful in agriculture.
- 13. List five modes of communication used in ancient, middle and modern India and explain that these changes from ancient to modern are a result of scientific innovations.
- 14. Explain the applications of science in everyday life.

Concept II: Scientific method involves identification of problem, gathering information through observation and experimentation, formulating hypothesis, testing hypothesis and generalization.

Tools of Evaluation

Student Record, MCQ, VSA, SA, LA, type of questions

1. *Student record:* Students may be asked to investigate one problem using scientific method and to keep record as illustrated below, which may then be used by the teacher to guide the student.
 - a) Observe and record ten biological and physical phenomena from everyday life.
 - b) Identifies one problem from among the ten phenomena listed at (a) e.g., condition necessary for germination of a seed, rusting of bicycle chain in rainy season etc.'
 - c) Solves the problem stated at (b) using scientific method and records the various steps followed as illustrated here.

Problem 1: How does temperature affect the sprouting of seeds?

Step I: Experiment

- a) Obtain 4 bean seeds, 4 radish seeds, and some plastic wrap.
- b) Place the seeds on well-soaked paper towels. Wrap the seeds with towel material in plastic wrap.
- c) Place one plastic wrap near a heater and another in a cool place, preferably the refrigerator.

Step II: Collecting data

- a) Observe your wrapped seeds each day for one week and record your observations.
- b) At the end of the week, compare the seeds in each plastic wrap.

Step III: Hypothesizing

How do you think the difference in temperature will affect the sprouting of seeds? (e.g., temperature has no effect on the sprouting of seed or temp. helps in the sprouting of seeds etc.)

Step IV: Comparing

Note down the difference between the seeds of two plastic wraps.

Step V: Inferring

Why do you think these differences occur?

Problem 2: Find out the proper conditions for germination of seeds.

Note: Children may be asked to do these activities in groups.

MCQs

1. Your teacher conducted and showed an experiment on germination of seeds, which is depicted in the following diagram.
Here seed No. 2 is properly germinating due to,
A. presence of air.
B. exposure to light.
C. presence of water.
D. presence of air and water both.
2. The sprouted seed in the above experiment will grow into a plant only if,
A. this is planted in ground.
B. this remains in water for a long time.
C. cotyledons are removed.
D. embryos are removed.

VSA

3. Why does your mother prefer to boil milk twice in a hot summer day?

SA

4. Devise an experiment to show that water is essential for the growth of plants.
5. What method would you follow to find out whether sand or soil is more suitable for seed growth.

Long Answer

6. What are the steps in a scientific method? Explain taking one example from everyday life.

Concept III: Science can be used for both constructive and destructive purposes.

Tools of Evaluation : Fill in the blanks, VSA, SA, LA type of questions.

Fill in the blanks

1. a) Atom bomb has played _____ role in the history of mankind.
b) Alexander Fleming discovered _____.
c) Penicillin has cured people from ____.

- d) Louis Pasteur's discovery of _____ is used in food industry.
- e) Pumps and canals provide us more water for _____.
- f) Crops can be saved from insects with the help of _____.
- g) Better seeds and fertilizers have helped us to increase _____.
- h) Microscope is useful in _____.

VSA

- 2. Write the names of two deadly weapons.
- 3. Write two industrial wastes that cause pollution of air.
- 4. Mention two applications of science from everyday life.

SA

- 5. Write names of two scientists and their discoveries that have helped us to protect from/cure diseases.
- 6. Mention two advantages and two disadvantages of factories.

Long Answer

- 7. How is science useful in increasing the production of grains?
- 3. How is science useful in spreading literacy among masses?
- 9. Explain that science has provided us better living conditions with the help of two examples from everyday life.

Concept IV: Science as a human activity is universal in nature.

Tools of Evaluation

Student's record, fill in the blanks, true/false, SA type of questions.

Students Record

- 1. Student's may be asked to collect pictures of scientists (particularly Indian Scientists), and also information from various magazines, newspapers etc. about their works, various science projects etc.

Fill in the blanks

- 2. Complete the following table.

<i>Discovery/ Invention</i>	<i>Discoveror/ Inventor</i>	<i>Country</i>
i) Microscope	Leeuwenhock	—
ii) Vaccine	—	England
iii) —	Alexander Fleming	England
iv) Ayurveda	—	India

3. Name the discoveror or inventor and the country to which he/she belonged, for the following discoveries/inventions.

<i>Discovery/Invention</i>	<i>Discoveror/Inventor</i>	<i>Country</i>
i) Sensitivity of plants	—	—
ii) Methods of preservation of food and milk.	—	—
iii) Radium and Polonium	—	—
iv) Vaccine	—	—

4. Which of the following statements are true?
- Scientific discovery is universal in nature.
 - Penicillin is used in India to cure infectious diseases because it was discovered by Indian scientist.
 - Ayurveda system of medicine discovered by Nagarjuna can be used in India only.
 - Smoke causes air pollution.
 - Discovery of radioactive elements has helped to cure disease.
 - Industries are responsible for air and water pollution both.
 - Science finds application in everyday life.
 - Poisonous gases should not be used in wars.
 - Bullets should be used for killing animals in forests.
 - Science should be used for the welfare of the people.

SA

5. Name two Indian scientists and describe their contributions in the growth of science.

Things Around Us

S.No.	Concepts	Skills/Competencies	Specific tasks/behaviours	Tools of Evaluation
1	2	3	4	5
I.	Classification is the process of grouping things on the basis of their characteristics	Differentiates one substance from another on the basis of its characteristics.	<p>Lists some natural and some man-made objects around him.</p> <p>Lists some living and non-living objects around him.</p> <p>Differentiates between living and non-living objects.</p> <p>Differentiates between objects made up of plastic, glass and metal e.g., flower pots, toys etc.</p> <p>Collects some 10-20 objects available in the classroom e.g. lunch boxes, water bottles, pencils, books, erasers etc. and lists the characteristics on the basis of which these objects can be classified e.g., colour, shape, material, size, function etc.</p> <p>Forms a group of objects selected on the basis of similar characteristics and compares his own group of objects with that of the other students.</p> <p>Defines a group.</p>	MCQ, VSA, and student record.
		Identifies the characteristics of objects that can be used to classify things e.g. size, shape, colour, material etc.		Student record
		Classifies things into groups.		
		Recognises a group and the purpose of classification.		

1	2	3	4	5
			<p>Cites examples of classification of objects into groups.</p> <p>Lists various purposes or classification of objects.</p> <p>Describes the classification methods he uses at home for keeping his study books/sports material, cloths, etc.</p> <p>Collects information on methods of 'classification of books in the school library' and 'Classification of apparatus in science lab'</p> <p>Explains the role of classification of books in the library and the role of classification of apparatus in the laboratory.</p> <p>Illustrates the use of classification of objects in everyday life.</p> <p>Lists some materials and substances around him that he can</p> <p>A) see B) touch C) smell or D) taste</p> <p>Illustrates that all materials and substances are made up of matter.</p>	Student record
II.(a)	<p>Anything that can be felt through senses is matter</p> <p>Recognizes that all materials and substances are made up of matter.</p>	<p>Appreciates the role of classification in day to day life.</p> <p>Recognizes that materials and substances around him can be seen, touched, smelt or tasted.</p>		

1	2	3	4	5
				Student record
II.	Matter has mass and occupies space.	Suggests experiments to show that matter has mass and occupies space.	Performs experiments, and observations to show that	
(b)		<p>Observes that matter has mass and occupies/space.</p> <p>Infers that matter has mass and occupies space.</p>	<p>a) air has mass</p> <p>b) water occupies space</p> <p>c) copper coin occupies space.</p>	
III.	Matter exists in three different states—solid, liquid, and gaseous.	Recognizes that matter exists in three states: solid, liquid and gaseous.	Recalls that water, steam and ice are different states of the same substance 'water'.	
(a)		Distinguishes between different states of matter.	Cites examples of solids, liquids and gases from everyday life.	
III.	Matter can change its form from one state to another i.e. from solid to liquid, liquid to gaseous and vice-versa.	Recalls the terms—melting, m.pt., evaporation, b.pt., freezing, freezing pt.	Differentiates between a solid and a liquid, a liquid and a gas, a gas and a solid etc.	
(b)		Understands the process of 'melting', 'evaporation' and 'freezing'.	Defines the terms 'melting', 'm.pt.', 'evaporation', 'b.pt.', 'freezing', 'freezing pt'.	
			Cites examples of 'melting', 'evaporation', and 'freezing' from everyday life.	
			Illustrate the processes of melting, evaporation and condensation.	

1	2	3	4	5
		<p>Designs and performs experiments.</p> <p>Records observations and infers on the basis of observations that matter changes its state.</p>	<p>Performs the following experiments and records the change of state and the temperature at which change occurs.</p> <p>Change of ice to water, water to steam, melts wax, heats sugar till it becomes liquid, Observes evaporation of petrol, alcohol and flit, steam to water, water to ice, liquid wax to solid wax, liquid sugar to crystals.</p> <p>Describes the processes involved in above changes.</p>	5
		<p>Solves problems in everyday life involving change of state.</p>	<p>Explains happenings/situations in every day life involving change of state e.g. evaporation of vicks, petrol, melting of ghee etc.</p>	
IV.	<p>Materials can be classified on the basis of their solubility in water, behaviour towards magnet, heaviness or lightness with respect to water. transparency or opaqueness etc.</p>	<p>Classifies substances on the basis of their state as solids, liquids and gases. Compares behaviour of different substances e.g. iron, pins, plastic, buttons, chalk powder, wood shavings, copper wire towards magnet, towards heaviness or lightness with respect to water. transparency or opaqueness etc.</p>	<p>Lists some solids, liquids and gases. Selects solids from a group of substances. Observes the behaviour of magnet towards (a) Iron (b) copper wire (c) aluminium spoon (d) plastic (e) wood (f) chalks (g) carbon (h) pins (i) clips (j) nails.</p> <p>Lists objects that are attracted by iron.</p>	

1	2	3	4	5
		Classifies material and substances on the basis of their behaviour towards magnet.		
		Distinguishes between substances that are soluble in water and substances that are insoluble in water.	Observes the behaviour of sugar, chalk powder, sand and washing soda towards water.	
			Observes behaviour of kerosene and ghee towards water.	
		Classifies materials on the basis of their solubility in water.	Identifies substances that are soluble in water and substances that are insoluble in water.	
		Observes that materials when put in water either float or sink and infers that objects can be classified as lighter or heavier than water.	Performs simple experiments with objects made up of different materials e.g., iron nail, piece of copper, aluminium spoon, plastic toy, wood piece, piece of paper, stone, chalks, kerosene oil etc. and records observations which of these objects float/sink in water.	
			Lists objects which float in water.	
			Classifies objects using the characteristic of light/heavier than water.	
		Understands the terms 'transparent' and 'opaque'.	Defines the terms 'transparent' and 'opaque'.	

1	2	3	4	5
				Compares 'transparent' and 'opaque' objects.
				Lists some transparent objects and some 'opaque' objects.
V.	Objects and materials are made up of basic units (building blocks) called 'elements'	and Recognizes that some elements occur free in nature whereas some are found in combined state.		Lists some common elements that occur free in nature e.g., oxygen, nitrogen and gold.
		Recognizes that these elements are the basic units in materials/substances.		Lists substances that exist in combined state such as water, proteins, etc.
		Infers that most of the common materials are made up of one or more of these elements.		Lists some common elements that exist in combined state such as sodium in common salt (sodium chloride), carbon, hydrogen and oxygen in sugar.
				Recalls there are more than 100 known elements.
				Illustrates that most of the common materials e.g. water, salt and sugar are made up of one or more of these elements.

Lists some common metals such as gold, copper, silver etc.

Lists some common non-metals such as hydrogen, carbon, oxygen and sulphur.

Observes some common properties of metals such as good conductors of heat and electricity, lustre and are generally solids.

Relates the properties of metals to their uses.

Differentiates between metals and non-metals on the basis of above properties.

Selects metals from a group of elements.

Lists some compounds.

Lists some mixtures.

Prepare mixture of iron and sulphur and observes that this mixture can be separated in its constituent elements.

Elements can be identified and on the basis of their properties.

Compares properties of metals and non-metals

Classifies elements as metals/non-metals.

as metals, solids, liquids and gases. Elements are mainly classified as metals and non-metals.

Substances that Identify a compound.

consist of two or more elements Identify a mixture.

combined together in such a way that the properties of the substances are lost.

Distinguishes between compounds and mixtures.

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Prepares compound of iron and sulphur i.e., iron sulphide by heating and observes that compound can not be separated into iron and sulphur using magnet and properties of compound are entirely different from its constituent elements.

Defines a compound.

Defines a mixture.

Compares compounds and mixtures with the help of examples from everyday life.

VII.

(b) When two or more substances (elements/compounds) are mixed together in such a way that they do not lose their own properties, they form a mixture.

VIII.

(a) Observes that substances like kerosene and chalk can be broken down into smaller particles.

Observes that molecules of water break into hydrogen and oxygen by passing electric current through water.

1	2	3	4
VIII. (b)	Atom of same or different elements combine to form molecules. A molecule formed from the same kind of atoms is called the molecule of an element. A molecule which consists of atoms of two or more different elements is called the molecule of a compound.		<p>Defines an atom.</p> <p>Defines a molecule.</p> <p>Cites example of atoms and molecules.</p>
IX.	The three states of matter—solid, liquid and gas have different arrangements of molecules and therefore different properties of shape and volume.	Recognizes that matter exists in three different states. Illustrates that ice, water and steam are three different states of the same matter. Relates the difference in properties of shape and volume to different arrangement of molecules in solids, liquids and gases.	<p>Cites examples of different States of matter.</p> <p>Performs simple experiments with chalk, metal, water, kerosene, hydrogen, balloon, smoke, agarbatti etc. and records his observations that which of these substances change their shape/volume.</p> <p>Infers on the basis of above observations that solids have definite shape and volume. Liquids have fixed volume, but do not have fixed shape. Gases do not have a fixed shape and volume.</p> <p>Explains events/happenings in everyday life e.g. leakage in gas cylinder can be smelt in another room or why gas leakage in Bhopal affected a large number of persons.</p>

Concept I: Classification is the process of grouping things on the basis of their characteristics

Tools of Evaluation: MCQ, VSA, SA, Student Record.

MCQ

1. Which of the following is *not* a stationery item?
 - A. Book
 - B. Ink
 - C. Blackboard
 - D. Register
2. Select the object that does not belong to the group given below.
 - A. Table
 - B. Chair
 - C. Almirah
 - D. Carpet
3. Which of the following items is different from other three of the group?
 - A. Samosa
 - B. Tea
 - C. Burfi
 - D. Coffee
4. You have a group of four objects namely, shirt, trousers, necktie and handkerchief. Which of the following characterize this group?
 - A. Material
 - B. Size
 - C. Colour
 - D. Shape

VSA

5. List four man made and four naturally occurring materials.
6. Classify the following objects as living or non-living.
(a) Blackboard (b) Table (c) Cow (d) Bear (e) Chair (f) Plastic button (g) Snake (h) Plant (i) Men (j) House.
7. Form a group of stationery items from the following list of objects.
(a) Table (b) Chair (c) Pencil (d) Book (e) Eraser (f) Blackboard (h) Lunch Box (i) Bag.
8. Six objects are listed in column A of the table given below. Complete the table by writing use in column B against each item of column A. Select a group on the basis of use for which these objects are used.

THINGS AROUND US

Column A

Column B

- a) Shirt
- b) Shoe
- c) Jeweller
- d) Scissor
- e) Saree
- f) Thread

- i) _____
- ii) _____
- iii) _____
- iv) _____
- v) _____
- vi) _____

SA

9. What is the significance of classification in everyday life? Illustrate giving two examples from everyday life.
10. Write method of classification of books, clothes and sports material used at your home.

Student Record

Student may be asked to study and record their observations about classification of apparatus in science lab, books in school library; grocery item's in Super Bazar etc.

- Concept II:** 2a) Anything that can be felt through senses is matter.
2b) Matter has mass and occupies space.

Tools of Evaluation: Student record, MCQ, Fill in the blanks, VSA and SA

Student Record

1. Students perform simple experiments to show that matter has mass and occupies space—air, water, stone, etc. may be taken as examples. Students record their observations and conclusions drawn may be evaluated by the teacher for understanding of the concept and observations.

MCQs

2. A glass tumbler filled with water is heavier than the empty glass tumbler because
 - A. glass has mass.
 - B. water has mass.
 - C. glass occupies space.
 - D. water occupies space.
3. A glass tumbler of 250 ml. capacity contains only 200 ml. of water. When a small piece of stone is immersed in the tumbler, water
 - A. rises in level.
 - B. lowers in level.
 - C. remains same in level.
 - D. spills out of glass.

4. When a piece of stone is dropped into a tumbler completely filled with water, the water flows out of the tumbler because
- water has mass.
 - stone has mass.
 - stone occupies space.
 - tumbler occupies space.
5. Size of a balloon increases when air is blown into it because
- air occupies space.
 - air has mass.
 - balloon has mass.
 - balloon occupies space.
6. An inflated football is heavier than a flat football because of the change in
- mass.
 - size.
 - shape.
 - volume.
7. Put a book on the table. The space of table occupied by book is called
- mass.
 - volume.
 - area.
 - weight.
8. Put a piece of stone in a glass tumbler filled with water. The space occupied by stone is called
- mass.
 - volume.
 - area.
 - length.
9. A cycle tyre when punctured becomes flat because
- volume of air inside tyre decreases.
 - volume of air in the tyre increases.
 - mass of tyre changes.
 - volume of the tyre changes.
10. Fill in the blanks
- A soda water bottle contains 200 ml. of soft drink. 200 ml. is the _____ of soft drink.
 - Matter has _____ and occupies _____.
 - Suspend an inflated football from one side of the balance. The beam of the balance tilts towards the football because of _____ football.
 - Table occupies _____ in the room.
 - Air, water, plant, stone and rat are _____.

THINGS AROUND US

VSA

11. Name one material each that can be (a) seen (b) touched (c) smelt (d) tasted.
12. Name five substances around you that are made up of matter.

SA

13. Illustrate with the help of suitable experiments that air has mass, volume and occupies space.
14. Explain that water is matter.

Concept III: a) Matter exists in three different states— solid, liquid and gaseous, b) Matter can change its form from one state to another i.e.; from solid to liquid to gas and vice versa.

Tools of Evaluation: MCQ, Fill in the blanks, VSA, SA, Student Record.

MCQs

1. Which of the following is a liquid at room temperature of 30°C ?
 - a) Gold
 - b) Silver
 - c) Mercury
 - d) Copper
2. Which of the following is a solid at room temperature 30°C ?
 - a) Ice
 - b) Mercury
 - c) Wax
 - d) Vegetable oil
3. Which of the following is a gas at room temperature of 30°C ?
 - a) Water
 - b) Petrol
 - c) Alcohol
 - d) Air
4. The m.pt. of ice is
 - a) 0°C .
 - b) 80°C .
 - c) 100°C .
 - d) 180°C .

5. Which of the following does not evaporate at room temperature of 30°C ?

- a) Water.
- b) Petrol.
- c) Alcohol.
- d) Flit.

Fill in the blanks

- 6. The process of changing steam into water by cooling is called _____.
- 7. The process of changing water into ice by cooling is called _____.
- 8. The process involved in the conversion of liquid sugar to solid sugar is called _____.
- 9. Copper is first _____ and then drawn into wires.
- 10. When a candle is lighted, the droplets of wax are seen on the sides of candle due to _____ of wax.
- 11. Water when heated to 100°C , changes into steam due to _____ of water.
- 12. When water boils in a vessel, water droplets are formed on the lid due to _____ and _____.
- 13. Condensation is the process of changing _____ into _____.
- 14. Ice melts to form _____.

VSA

- 15. Name three substances that exist as solids at room temperature (30°C).
- 16. Name three substances that exist as liquids at room temperature (30°C).
- 17. Name three substances that exist as gases at room temperature.
- 18. Name three states of water.

Concept IV: Materials can be classified on the basis of their state, solubility in water, behaviour towards magnet, heaviness or lightness with respect to water, transparency or opacity etc.

Tools of Evaluation: MCQ, Fill in the blanks, V.S.A.

MCQs

1. Which of the following objects is attracted by magnet?
 - a) Silver coin
 - b) Gold coin
 - c) Aluminium wire
 - d) Iron nails
2. A piece of wood floats on water because it
 - a) is lighter than water.
 - b) is heavier than water.
 - c) soaks water.
 - d) does not react with water.
3. Which of the following is a transparent object ?
 - a) Glass
 - b) Blackboard
 - c) Wood
 - d) Wax
4. Which of the following is soluble in water ?
 - a) Sugar
 - b) Chalk powder
 - c) Kerosene
 - d) Sand
5. Which of the following is insoluble in water?
 - a) Common salt
 - b) Sugar
 - c) Washing soda
 - d) Chalk powder

Fill in the blanks

6. a) Tea leaves are _____ in water.
- b) Substances that disappear on adding water are called _____ in water.
- c) _____ substances form a separate layer when water is added to these.
- d) Objects made up of _____ are attracted by magnet.
- e) Objects through which you can see are called _____.
- f) Objects through which you cannot see are called _____.
- g) Objects that float on water are _____ than water.

- h) Objects that sink in water are _____ than water.
- i) An iron needle _____ water.
- j) An empty plastic tumbler _____ water.

VSA

- 7. List five soluble materials. Also name substances in which these are soluble.
- 8. List five insoluble materials. Also name substances in which these are insoluble.
- 9. Mention three examples of opaque objects.
- 10. Mention the state as solid, liquid or gas of the following objects (a) plastic (b) gold (c) milk (d) chalk (e) air (f) vapour (g) water (h) oxygen.
- 11. Classify the following materials as lighter or heavier than water.
(a) Plastic button (b) Iron nail (c) Copper coin (d) Aluminium plate
(e) Small piece of wood (f) Piece of chalk (g) Kerosene (h) Cooking oil
- 12. Classify the following materials as transparent opaque.
(a) Piece of cardboard (b) Sheet of notebook paper
(c) Glazed paper (d) Glass (e) Water (f) Acrylic sheet
(g) Sunmica sheet (h) Aluminium sheet
(i) Polythene paper
- 13. Classify the following materials as solid, liquid or gas.
a) Nitrogen (b) Oxygen (c) Water (d) Petrol
(e) Candle wax (f) Air (g) Sand (h) Sugar (i) Spirit
(j) Mustard oil (k) Alcohol
- 14. Classify the following materials as soluble or insoluble in water.
(a) Gold (b) Silver (c) Kerosene (d) Alcohol (e) Chloroform (f) Coconut oil
(g) Chalk powder (h) Candle wax (i) Sugar (j) Common salt (k) Nitrogen
(l) Washing soda (m) Hydrogen.

Concept V: Objects and materials are made up of basic units (building blocks) called elements.

Tools of Evaluation: MCQ, Fill in the blanks, S.A.

MCQs

- 1. Which of the following elements exist in free state in nature?
 - A. Copper
 - B. Diamond
 - C. Silver
 - D. Aluminium.

2. Which of the following elements does not exist free in nature?
 - A. Nitrogen
 - B. Oxygen
 - C. Hydrogen
 - D. Chlorine.
3. Which of the following substances contain carbon, hydrogen and oxygen?
 - A. Sugar
 - B. Common salt
 - C. Washing soda
 - D. Petrol.
4. Which of the following substances is made up of more than one element?
 - A. Carbon dioxide gas
 - B. Nitrogen gas
 - C. Hydrogen gas
 - D. Chlorine gas
5. Which of the following substances is made up of oxygen and hydrogen only?
 - A. Water
 - B. Petrol
 - C. Alcohol
 - D. Coconut oil.
6. The element which is common in brick, glass, clay and sand paper is
 - A. Carbon.
 - B. Silicon.
 - C. Hydrogen.
 - D. Oxygen.
7. Which of the following substances does not contain carbon ?
 - A. Cooking oil
 - B. Common salt
 - C. Sugar
 - D. Soap
8. Which of the following elements exist in the liquid state at room temperature ?
 - A. Carbon
 - B. Mercury
 - C. Sulphur
 - D. Sodium
9. Which of the following elements is not found in free state in nature ?
 - A. Nitrogen
 - B. Hydrogen
 - C. Silicon
 - D. Carbon

10. Petrol consists of
- Carbon and Hydrogen.
 - Hydrogen and Oxygen.
 - Carbon and Nitrogen.
 - Carbon and Oxygen.

Fill in the blanks

11. a) Objects and materials are made up of _____.
b) Total number of elements known are _____.
c) _____ are the basic units of all materials.
d) The number of naturally occurring elements is _____.
e) Urea is made up of carbon, hydrogen, oxygen and _____.
f) Common salt is made up of _____ and _____.

VSA

12. Name three elements found in free state and three elements found in combined state in nature.
13. Name one substance each which occurs free in nature as solid, liquid and gaseous state.
14. Name the element which is common to brick, glass, clay and sand paper.
15. Name the element which is common to sugar, urea, washing soda, kerosene, quinine.

SA

16. List ten elements known to you either in combined or free state.

Concept VI: Elements can be identified and classified on the basis of their properties such as solids, liquids, gases, metals and non-metals. Elements are mainly classified as metals and non-metals.

Tools of Evaluation: MCQ, T/F, VSA, SA.

MCQs

1. Which of the following is a non-metal?
- Gold
 - Platinum
 - Diamond
 - Silver
2. Which of the following is a good conductor of electricity?
- Carbon
 - Aluminium
 - Hydrogen
 - Water

3. The metal used in electrical bulbs is
 - A. Platinum.
 - B. Tungsten.
 - C. Copper.
 - D. Aluminium.
4. Copper is used for electrification purposes because it is
 - A. good conductor of heat.
 - B. bad conductor of heat.
 - C. bad conductor of electricity.
 - D. good conductor of electricity.
5. Which of the following is a metal ?
 - A. Mercury
 - B. Carbon
 - C. Sulphur
 - D. Phosphorus
6. Which of the following is the characteristic of a non-metal?
 - A. Good conductor of heat.
 - B. Exists as solid only.
 - C. Exists as solid, liquid or gas.
 - D. Has lustre.
7. Iron is *not* used for electrification purposes because
 - A. it is good conductor of heat.
 - B. it is good conductor of electricity.
 - C. it is solid
 - D. has low m.pt.
8. Indicate true/false against each of the following.
 - (a) All forms of carbon has lustre.
 - (b) Copper is a good conductor of electricity.
 - (c) Hydrogen is a good conductor of electricity.
 - (d) Aluminium is a non-metal.
 - (e) Carbon exists as solid.
 - (f) Mercury exists as solid.
 - (g) Non-metals exist as solid-liquids or gases.
 - (h) Aluminium is used for making utensils.
 - (i) Platinum is used in electricity bulbs.
 - (j) Silver is used for making jewellery.

VSA

9. Write names of five metals and five non-metals.
10. Classify the following materials as metals or non-metals :
 (a) Copper (b) Silver (c) Graphite (d) Sulphur (e) Hydrogen (f) Chlorine (g) Iron
 (h) Aluminium (i) Oxygen (j) Mercury.

Concept VII: a) Substances that consist of two or more elements combined together in such a way that the properties of the substance are altogether different from those of the elements are called compounds.

b) When two or more substances (elements or/and compounds) are mixed together in such a way that they do not lose their own properties, they form a mixture.

Tools of Evaluation : MCQ, T/F, SA, Students Observation

MCQs

- Which of the following substances is not a compound ?
 A. Sugar
 B. Common Salt
 C. Steel
 D. Washing Soda.
- Which of the following substances is a mixture ?
 A. Water
 B. Air
 C. Iron Sulphide
 D. Alcohol.
- Magnesium wire burns in air to form
 A. a compound.
 B. a mixture.
 C. a new element.
 D. the same element.
- When platinum wire is heated,
 A. a compound is formed.
 B. a mixture is formed.
 C. it becomes red hot.
 D. it becomes brittle.

5. Which of the following statements is true if an element A, combines with an element B to form a compound AB?
- Element A retains its properties
 - Element B retains its properties
 - Compound AB shows properties of both A and B
 - Compound AB has altogether different properties.
6. Water is a compound of hydrogen and oxygen because its properties are
- similar to that of H_2 .
 - similar to that of O_2 and H_2 both.
 - similar to that of O_2 .
 - different from H_2 and O_2 .
7. A mixture of Iron and sulphur can be separated by
- magnet.
 - heating.
 - treating with H_2O .
 - treating with acid.
8. On heating sulphur powder with iron powder, a new substance is formed that has properties
- of sulphur.
 - of iron.
 - of sulphur and iron both.
 - different from sulphur and iron.
9. Air shows properties of
- Oxygen, nitrogen and hydrogen.
 - Oxygen only.
 - Nitrogen only.
 - Hydrogen only.
10. Which of the following substances is a mixture of nitrogen, hydrogen and oxygen?
- Air
 - Urea
 - Quinine
 - Nitric acid.
11. Indicate True/False against each of the following statements.
- Washing soda is a mixture of sodium, carbon, and oxygen.
 - Mixture of iron and carbon is attracted towards magnet.
 - Soap is a compound of carbon, hydrogen and oxygen.
 - Two or more elements react chemically to form a compound.
 - Elements of a mixture can be separated by mechanical device.
 - Properties of elements do not change in a mixture.

- (g) Properties of compounds are similar to those of elements they are made up of.
- (h) Kerosene is a mixture of carbon and hydrogen.
- (i) Iron sulphide is attracted towards magnet.
- (j) Mixture of iron and sulphur is attracted towards magnet.

S.A.

12. Write names of four compounds of everyday use and explain why you have classified these as compounds. as compounds.
13. Write names of four mixtures of everyday use and explain why you have classified these as mixtures.

Student's Record of Observations

Students perform simple activities and record their observations e.g.

14. a) Physical properties of sulphur. (colour, behaviour towards magnet)
- b) Physical properties of iron (colour, behaviour towards magnet)
- c) Mix sulphur and iron and observe the behaviour of mixture towards magnet, its colour, etc
- d) Heat sulphur and iron and observe the behaviour of substance formed towards magnet, its colour etc.
- e) Forms hypothesis.
- f) Verifies hypothesis using different mixtures and compounds.

Concept VIII: a) The smallest possible particle of an element is called an atom. All atoms of an element are identical and alike.

b) Atoms of same or different elements combine to form molecules. A molecule formed from the same kind of atoms is called the molecule of an element. A molecule which consists of atoms of two or more different elements is called the molecule of a compound.

Tools of Evaluation : MCQ, T/F

MCQs

1. A mist of fine particles is formed when flit is sprayed against light because of
 - A. presence of dust particles in air.
 - B. breakdown of flit into small particles.
 - C. dispersion of light.
 - D. evaporation of flit.

The smallest particle of an element is

- A. molecule.
- B. atom.
- C. ion.
- D. electron.

The smallest particle of a compound is

- A. element.
- B. atom.
- C. molecule.
- D. ion.

A molecule of water is made up of

- A. one molecule of hydrogen and one molecule of oxygen.
- B. one atom of hydrogen and one atom of oxygen.
- C. two atoms of hydrogen and one atom of oxygen.
- D. one atom of water.

The smallest particle in 'Water' compound is

- A. a molecule of water.
- B. molecules of hydrogen and oxygen.
- C. atom of hydrogen and oxygen.
- D. elements hydrogen and oxygen.

When electric current is passed through water, the gases evolved at the electrodes are

- A. molecular hydrogen and molecular oxygen.
- B. atomic hydrogen and molecular oxygen.
- C. water vapours.
- D. atomic hydrogen and atomic oxygen.

Silver metal exists in nature as

- A. atom.
- B. molecule.
- C. element.
- D. compound

Hydrogen exists normally as

- A. an atom.
- B. a molecule.
- C. ion.
- D. electron.

9. Which of the following is the molecule of an element ?
A. Oxygen gas
B. Water
C. Hydrogen chloride
D. Iron sulphide.
10. Which of the following is the molecule of a compound ?
A. Hydrogen
B. Chlorine
C. Steam
D. Oxygen.
11. Indicate true/false against each of the following statements.
a) An atom exists free in nature.
b) A molecule is the smallest particle of a compound.
c) A molecule is formed only when two atoms of the same element combine.
d) All atoms of an element are identical and alike.
e) All molecules of a compound are identical and alike.
f) An atom can be seen through a microscope.
g) The Hydrogen gas exists as an atom.
h) A molecule of a compound consists of atoms of two or more different elements.
i) A molecule of an element is formed from the same kind of atoms.

Concept IX: The three states of matter solid, liquid and gas have different arrangement of molecules and therefore different properties of shape and volume.

Tools of Evaluation: MCQ, SA.

MCQs

1. You are given three balloons of equal size A, B, and C. 'A' is filled with sand, 'B' is filled with kerosene and 'C' is filled with air. Which of the following statements is correct?
A. 'A' is least compressible while 'C' is most compressible.
B. 'B' is least compressible while 'C' is most compressible.
C. 'C' is least compressible while 'A' is most compressible.
D. 'C' is least compressible while 'B' is most compressible.
2. Three vessels A, B and C are of equal size. Vessel A is filled with sugar, B is filled with water and C is filled with oxygen. Which of the following statements is correct?
A. Molecules in vessel C are farthest while in B are closest.
B. Molecules in vessel A are closest while in C are farthest.
C. Molecules in vessel B are closest while in A are farthest.
D. Molecules in vessel A are farthest while in B are closest.

3. The three physical states of water, namely, ice, water and steam have different
 - A. arrangement of molecules.
 - B. shapes of molecules.
 - C. sizes of molecules.
 - D. constitution of molecules.
4. Solids have definite shape because molecules in solids are arranged
 - A. loosely.
 - B. closely.
 - C. symmetrically.
 - D. asymmetrically.
5. Which of the following characteristics would change if 200 mls of a liquid is transferred from a bottle to a glass tumbler?
 - A. Shape
 - B. Volume
 - C. Mass
 - D. Density.
6. 50 ml. hydrogen gas contained in a conical flask of 50ml. capacity is blown into a bigger jar of 100 ml. capacity. Which of the following observations about hydrogen gas is correct?
 - A. Volume and shape both change.
 - B. Volume only changes.
 - C. Shape only changes.
 - D. No change takes place.
7. Leakage of cooking gas can be smelt in any corner of the kitchen because
 - A. it is lighter than air.
 - B. it is insoluble in water.
 - C. it forms mixture with air.
 - D. it's molecules move freely.
8. Which of the following substances has closed arrangement of molecules?
 - A. Ice.
 - B. Water.
 - C. Steam.
 - D. Air.
9. A gas jar 'A' contains oxygen gas and another gas jar 'B' contains nitrogen gas. Jar 'A' was placed on jar 'B' and the jar lids were removed. The gas/gases in jar 'A' would be
 - A. oxygen.
 - B. nitrogen.
 - C. mixture of oxygen and nitrogen.
 - D. nitric oxide.

10. Which of the following substances has definite shape and volume?
- Copper.
 - Mercury.
 - Water.
 - Air.
11. Which of the following substances has definite volume but not shape?
- Alcohol.
 - Smoke.
 - Coffee powder.
 - Glass.

SA

Explain the following phenomenon.

- Agarbatti burning in one corner of the room can be smelt in any corner of the room.
- Mercury changes its shape with the container whereas silver does not.
- Leakage of 'oleum' gas in a factory also harmed people living 10 Kms. away from the factory.
- Ice, water (liquid) and steam all contain same kind of molecules but still have different physical states namely solid, liquid and gas.

Separation of Substances

S. No.	Concepts	Skills/Competencies	Specific tasks/Behaviours	Tools of Evaluation
I	Substances around us are often found in the form of mixtures	Distinguishes between a pure substance and a mixture. Identifies a mixture.	Lists some pure substances used in everyday life e.g., water, common salt, wheat, rice etc. Names common mixtures constituting these substances e.g., sea water, wheat husk, rice, stone piece etc.	MCQ, VSA, SA
	Separation of substances from mixtures is needed for various purposes.	Analyses the properties of a substance in a mixture. Infers that substances retain their properties in a mixture. Appreciates the role of separating pure substances from mixtures in day to day life.	Cites example of mixtures from everyday life e.g., sharbat, muddwater, air, smoke, etc. Observes that the properties of sugar do not change when it is mixed with water and so on.	
II	Various methods used to separate the components of mixture (determined by	Compares processes of winnowing, handpicking and sieving. Selects the process of separating components of a given mixture	Lists various purposes of separating pure substances from mixtures. Gives examples of situations where separation of pure substances from mixtures is needed e.g. separating drinking water from impurities, wheat grains from husk, common salt from sea water. Observes the processes of winnowing, handpicking and sieving used for separating mixture. Cites examples of mixtures that can be separated by 'winnowing', handpicking' and 'sieving'.	

1.	2.	3.	4.	5.
	<p>mixture (determined by the properties of the components) are</p> <p>Winnowing, Handpicking, Sieving, Magnetic separation Decantation Loading Centrifugation Filtration Crystallization Sublimation Distillation</p>	<p>Selects the process of separating components of a given mixture</p> <p>Separates mixtures using magnetic-separation</p> <p>Understands the terms 'Sedimentation' and 'Decantation'</p> <p>Separates solid-liquid mixtures using decantation</p> <p>Separates immiscible liquids using separating funnel</p>	<p>Cites examples of mixtures that can be separated by 'winnowing', 'handpicking' and 'sieving'.</p> <p>Names and explains the method of separating a given mixture.</p> <p>Lists examples where magnetic separation is needed</p> <p>Performs the experiment of magnetic separation with three/ four mixtures e.g. iron-carbon, iron sulphur, carbon-wood clips etc. and records his observations.</p> <p>Defines and explains the terms 'sedimentation' and 'decantation'.</p> <p>Cites examples of mixtures that can be separated by decantation.</p> <p>Lists the apparatus needed in decantation using sand and water mixture.</p> <p>Distinguishes between simple decantation and decantation using a separation funnel. Explains the need of a separating funnel.</p> <p>Distinguishes between miscible and immiscible liquids.</p> <p>Cites examples of mixtures that can be separated by use of separating funnel.</p> <p>Lists the apparatus needed in decantation using separating funnel.</p>	<p>MCQ, VSA, Checklist</p>

	Arranges the apparatus for 'decantation' of a mixture of kerosene oil and water. Performs the experiment of 'decantation'.	MCQ, VSA, Checklist
Loading	Identifies mixture that can be separated by method of 'loading'. Separates components of a mixture using the method of loading.	
'Centrifugation'	Separates components of a mixture using method of 'centrifugation'	MCQ, VSA, Check-list
Crystallization	Identifies mixtures that can be separated by crystallisation Separates mixtures by crystallization	
Sublimation	Identifies the mixtures which can be separated by 'sublimation'. Separates mixtures by 'sublimation'.	MCQ, checklist

Distillation	<p>Recalls what is a miscible liquid and what is an immiscible liquid.</p> <p>Identifies mixtures that can be separated by 'distillation'.</p> <p>Separates mixtures by distillation.</p> <p>Hypothesizes that the process of distillation can be used to separate two miscible liquid with different B.pts.</p> <p>Hypothesizes that the process of distillation can also be used to separate solid from its</p> <p>Infers that the process of distillation can be used to separate two miscible liquids with different B.pts and also to separate solid from its aqueous solution.</p>	<p>Lists apparatus used in 'sublimation'.</p> <p>Arranges apparatus for sublimation.</p> <p>Performs the experiment of sublimation using common salt and ammonium chloride mixture.</p> <p>Names some miscible and some immiscible liquids.</p> <p>Lists mixtures of miscible liquids having different B.pts.</p> <p>Lists the apparatus needed for 'distillation'.</p> <p>Arranges the apparatus for distillation.</p> <p>Illustrates the process of distillation by separating mixtures of alcohol and water and salt from its aqueous solution.</p> <p>Describes the process of distillation.</p>	MCQ, VSA
Pure substances are often obtained by using a combination of several methods of separation.	<p>Selects appropriate methods for separating components of a mixture.</p> <p>Separates mixtures containing three components such as iron filings, ammonium chloride and sand from their mixture using combination of various methods of separation.</p>	<p>Suggests methods for separating components of a mixture containing more than two substances eg., salt, sand and camphor, water, alcohol and sugar iron filings, ammonium chloride, and sand etc.</p> <p>Designs and performs experiment to separate a mixture of three components.</p>	

Concept: (a) Substances around us are often found in the form of mixtures. (b) Separation of substances from mixtures is needed for various purposes.

Tools of Evaluation: MCQ, VSA, SA

MCQ

1. Soil is a mixture of
 - A. various salts and sand.
 - B. clay and sand.
 - C. sand, clay and various salts.
 - D. dust particles and sand.
2. Common salt is obtained from
 - A. sea water.
 - B. pond water.
 - C. well water.
 - D. tap water.
3. Which of the following is a mixture?
 - A. Sulphur powder
 - B. Gun powder
 - C. Common salt
 - D. Sugar.
4. Which of the following substances has molecules of one kind only?
 - A. Milk
 - B. Sharbat
 - C. Tea
 - D. Water.
5. Which of the following properties characterise a mixture?
 - A. Components are present in a fixed proportion.
 - B. Components retain their properties.
 - C. Components lose their properties.
 - D. Components cannot be separated by mechanical methods.
6. Which of the following substances contain only one kind of molecules?
 - A. Air
 - B. Soil
 - C. Sand
 - D. Sea water.

7. Which of the following liquids would start boiling at 100°C?
 - A. Pure alcohol
 - B. Mixture of alcohol and water
 - C. Pure water
 - D. Mixture of alcohol, water and common salt.
8. Separation of the components of a mixture is usually done to obtain
 - A. Pure sample
 - B. Impure sample
 - C. Harmful component
 - D. Undesirable component.
9. Which of the following is a mixture?
 - A. Salt
 - B. Sugar
 - C. Jaggery
 - D. Alum.

VSA

10. List five pure substances.

SA

11. List five mixtures from everyday life and also write the components of these mixtures.
12. You are given two samples A and B. One of these is pure common salt and the other is a mixture of common salt and ammonium chloride. How will you identify the pure common salt sample?
13. When an epidemic spreads in the town, people are advised to boil and filter the drinking water. Explain why?

Concept II: Various methods used to separate the components of a mixture (determined by the properties of the components) are:

(a) Winnowing, (b) Handpicking, (c) Sieving, (d) Magnetic Separation, (e) Decantation, (f) Loading, (g) Centrifugation, (h) Filtration, (i) Crystallization, (j) Sublimation, (k) Distillation.

Tools of Evaluation: MCQ, VSA, SA, Check-lists.

MCQ

1. A farmer separates the husk from wheat by the process of
 - A. handpicking.

- B. sieving
C. magnetic separation
D. winnowing.
2. A mixture of sand and marble pieces can be separated by
A. winnowing.
B. sieving.
C. handpicking.
D. magnetic separation.
3. Iron is separated from a mixture of sulphur and iron by
A. winnowing.
B. handpicking.
C. magnetic separation.
D. sieving.
4. A housewife purchased two kilograms of rice and found stone pieces mixed with it. She can obtain a pure sample of rice by
A. handpicking.
B. sieving.
C. winnowing.
D. magnetic separation.
6. Alum is added to river water before decantation because it
A. loads the impurities.
B. is soluble in water.
C. does not react chemically with water.
D. does not react chemically with impurities.
7. Which of the following can be used as filtering media in the filtration of turbid water?
A. Filter paper
B. Clay
C. Cotton
D. Metallic filter.
8. Drinking water can be freed from bacteria by the process of
A. centrifugation.
B. decantation.
C. filtration.
D. boiling.
9. Two immiscible liquids of different densities can be separated by
A. filter paper.

- B. separating funnel.
C. centrifuge.
D. magnet.
10. In summer, the pond dries up by the process of
A. sublimation.
B. evaporation.
C. decantation.
D. crystallization.
11. Distillation consists of two processes, namely,
A. evaporation and condensation.
B. filtration and evaporation.
C. evaporation and sublimation.
D. filtration and crystallization.
12. The water used by doctors for dissolving medicine is obtained by the process of
A. distillation.
B. decantation.
C. filtration.
D. loading.
13. The method used for separating a solid from its aqueous solution is
A. filtration.
B. sublimation.
C. evaporation.
D. decantation.
14. Which of the following methods can be used to separate cream from milk?
A. filtration.
B. centrifugation.
C. crystallization.
D. decantation.
15. In which of the following methods, the substance is first converted into the gaseous form and then solidified?
A. crystallization.
B. evaporation.
C. distillation.
D. sublimation.
16. A mixture of alcohol and water can be separated by
A. distillation.

- B. evaporation.
- C. sublimation.
- D. filtration.

17. A mixture of common salt and iodine can be separated by
- A. magnetic separation.
 - B. sublimation.
 - C. crystallization.
 - D. evaporation.

SA

18. Name the method required to separate each of the following mixtures.
- A. Two miscible liquids with different B.pt's.
 - B. Two immiscible liquids with different densities.
 - C. A solid from its aqueous solution.
 - D. A liquid from its suspended impurities.
 - E. Two solids, one of which is volatile and other is non-volatile.
19. Diagrammatically show the filtration of clear water from muddy water.
20. Diagrammatically show the arrangement of apparatus for sublimation of ammonium chloride and salt mixture.

Check-lists

The teachers may use the following check-lists while the experiments are being done by the students.

- | | | |
|--------------------------------------------------------------------------------|-----|----|
| 1. Check-list for filtration: | Yes | No |
| (i) Folds the filter paper correctly to form the cone. | — | — |
| (ii) Fits the cone correctly in the funnel. | — | — |
| (iii) Fits the funnel in the stand. | — | — |
| (iv) Places the beaker properly underneath the funnel. | — | — |
| (v) Holds the glass rod properly. | — | — |
| (vi) Pours down the mixture along the rod gently. | — | — |
| (vii) Mixture in the filter paper cone does not exceed the height of the cone. | — | — |
| 2. Check-list for sublimation | Yes | No |
| (i) Cleans and dries the apparatus. | — | — |

- | | | |
|---------------------------------------------------------------------------------------------------------|---|---|
| (ii) Uses wire gauze to keep china dish over a tripod stand. | — | — |
| (iii) Covers the china dish with an inverted glass funnel so that no part of mixture is left uncovered. | — | — |
| (iv) Plugs the funnel properly so that no vapour escapes out. | — | — |
| (v) Heating is gentle and smooth | — | — |
| (vi) Scrapes out the sublimate correctly with a spatula. | — | — |

3. Check-list for distillation

- | | | |
|--------------------------------------------------------------------------|-----|----|
| | Yes | No |
| (i) Cleans the apparatus. | — | — |
| (ii) Fits up the apparatus properly. | — | — |
| (iii) Apparatus is airtight. | — | — |
| (iv) Nozzle of the delivery tube does not touch the mixture in the flask | — | — |
| (v) Heating is gentle and smooth. | — | — |
| (vi) There is no bumping of the mixture in the flask. | — | — |

Note:

The teacher can prepare check-lists for each experiment in the manner indicated above and may use these whenever the pupils are doing the experiments. The teacher should bear in mind that all the important steps including precautions should find place in the check-lists.

Concept III: Pure substances are often obtained by using a combination of several methods of separation.

Tools of Evaluation: MCQ, LA, SA, Check-list.

MCQs

- Which of the following combination of two methods is used to separate the mixture of iron filings, camphor and sand?
 - Magnetic separation and sublimation.
 - Filtration and sublimation.
 - Magnetic separation and crystallization.
 - Distillation and magnetic separation.
- A mixture of common salt and chalk powder can be separated by a combination of
 - decantation and crystallization.
 - decantation and sublimation.
 - loading and evaporation.
 - filtration and sublimation.

- A mixture of alcohol, water and sugar can be separated by
- evaporation and filtration.
 - crystallization and filtration.
 - distillation and crystallization.
 - distillation and sublimation.
- A housewife purchased 20 kgs. of wheat and found it mixed with husk and stone. She can obtain a pure sample of wheat by
- sieving and handpicking.
 - winnowing and sieving.
 - handpicking and decantation.
 - winnowing and handpicking.
- A mixture of kerosene, water and common salt can be separated by
- filtration and distillation.
 - filtration and evaporation.
 - decantation and crystallization.
 - decantation and evaporation.
- A mixture of alum, ammonium chloride and chalk powder can be separated by
- sublimation and decantation.
 - sublimation and crystallization.
 - loading and crystallization.
 - centrifugation and evaporation.
- Which of the following pair of processes is needed to separate the mixture of alum, water and mustard oil?
- decantation and crystallization.
 - filtration and evaporation.
 - decantation and evaporation.
 - filtration and crystallization.
- Which of the following pair of methods can be used to separate a mixture of iodine, common salt and sand?
- sublimation and evaporation.
 - sublimation and crystallization.
 - decantation and evaporation.
 - crystallization and decantation.
- Distinguish between
- decantation and filtration.

- B. evaporation and crystallization.
- C. distillation and sublimation.

LA

10. Describe various steps required to obtain a pure sample of common salt from impure s

Measurement

<i>S.No.</i>	<i>Concepts</i>	<i>Skills/Competencies</i>	<i>Specific Tasks/Behaviours</i>	<i>Tools of Evaluation</i>
I.	Measurement is needed in our daily life.	Observes and identifies the use of measurement in daily life activities.	<p>Lists different quantities to be measured in daily life.</p> <p>Groups different quantities into four fundamental quantities.</p> <p>Compares the measurements made by senses and guess work with standard measurements.</p>	Objective questions, student records VSA
II.	Standard, units of measurement are essential for the sake of uniformity.	<p>Appreciates the need of standard units for measurement of different quantities.</p> <p>Knows the standard units for measurement of fundamental quantities—length, mass, time and temperature.</p> <p>Understands the necessity of common units of measurement for uniformity.</p>	<p>Lists the different objects used for measurement of length.</p> <p>Compares the length of bodyparts of different people and concludes that the lengths of body parts are different for different persons.</p> <p>Names the standard unit of length, mass, time and temperature.</p> <p>Explains the need of sub and multiple units.</p>	Objective question VSA SA

1	2	3	4	5
III.	<p>Proper measurement of length can be made with the help of various types of measuring devices such as a ruler, a measuring tape, etc. The Standard/ unit of length, metre can be expressed as subunits and larger units</p> <p>Area and volume are desired quantities of length.</p>	<p>Chooses the appropriate devices for measurement of different lengths.</p> <p>Uses devices such as metre scale, tape etc. properly.</p> <p>Devices the method for measuring small lengths such as thickness of page of a book, small diameter of a wire etc.</p> <p>Uses appropriate units to express length.</p>	<p>Lists some common objects for length measurement</p> <p>Lists the different measuring devices such as rulers, metre tapes etc.</p> <p>Measures lengths of room, body parts using metre scale, chains etc.</p> <p>Identifies the correct metre scale.</p> <p>Suggests the suitable procedure measurement of small thickness.</p> <p>Estimates the length of unmeasurable lengths.</p>	<p>Objective Questions</p> <p>Very Short Answer</p> <p>Student Record</p>
IV.	<p>Area and volume are desired quantities of length.</p>	<p>Understands the concepts of area and volume.</p> <p>Measures area and volume accurately.</p>	<p>Explains the meaning of area and volume.</p> <p>Explains that area and volume are derived quantities of length.</p> <p>Lists the correct units of area and volume.</p> <p>Finds the area of some regular objects and uses the correct units.</p> <p>Makes use of graph paper for measuring</p>	<p>Objective Questions</p> <p>VSA</p> <p>SA</p> <p>Student Record</p> <p>Observation</p>

Measures volumes of oil, water using measuring cylinder, dropper etc.
 Uses the m, cm or mm for volume of any object but for liquids uses litre or millilitre (ml) as units.
 Lists various devices used in measuring the volume of liquids.

V. Mass is the Understands the concept of mass.
 measure of quality Measures the mass of different object—
 of matter small and large.

Explains the meaning of mass
 Knows when to use the unit multiples and sub multiples of unit of mass.
 Selects appropriate balance.
 Properly uses and handles beam balance
 Explains the need for accurate measurement of mass.
 Identifies the correct weights.

Objectives
 Questions
 VSA
 SA
 Students record
 Observation schedule

VI. Temperature is the Understands the concept of temperature.
 measure of degree Measures the temperature of different
 of hotness bodies.
 Develops the skill of correct use of thermometer.

Explains the measuring of temperature.
 Recognises that sense of hotness is relative and temperature is measured accurately by thermometer.
 Develops the skill of correct use of thermometer
 Distinguishes between different scales of temperature.
 Uses clinical thermometer correctly.
 Selects appropriate thermometer for measuring different ranges of temperatures.
 Explains the need for accurate measurement of temperature.

Objective
 Type
 VSA
 SA
 Student record
 Observational
 schedule or
 checklist

1	2	3	4	5	
VII.	<p>The principle of periodic motion is used in measuring time.</p> <p>Understands the concept of time.</p> <p>Measures time accurately.</p> <p>Realizes the importance of time in daily life.</p>		<p>Explains the concept of time.</p> <p>Recognises events as a measure of time.</p> <p>Analyses the periodic events and selects the standard for measurement of time.</p> <p>Lists the different units of time.</p> <p>Selects the appropriate unit of time for measurement.</p> <p>Distinguishes between different types of time measuring device such as water clock, biological clock, wall clock, stop watch and wrist watch etc.</p> <p>Records correct time with a clock.</p> <p>Properly uses the stop watch.</p> <p>Estimates time intervals.</p>	<p>Objective type</p> <p>VSA</p> <p>SA</p> <p>Student record</p> <p>Observation</p> <p>Schedule or checklist</p>	

Concept I: Measurement is needed in our daily life.

Fill in the blanks

1. In your routine medical examination in the school, the doctor measures your
(i) _____ (ii) _____ (iii) _____.
2. In the examination, you are allowed to complete the question paper in specified _____.
3. You buy vegetables by weighing these in _____.
4. In the hospital, doctor measures your body temperature in _____.
5. Tailor measures cloth with the help of _____.

MCQs

6. Space occupied by the table in your room can best be judged by
 - A. looking at the table.
 - B. looking at the room.
 - C. measuring the area of the room.
 - D. measuring the area of the table.
7. The quantity of kerosene oil purchased by you can be estimated by measuring the
 - A. length of vessel.
 - B. area of vessel.
 - C. volume of vessel.
 - D. weight of vessel.
8. Milk is measured in
 - A. grams.
 - B. litres.
 - C. milligrams.
 - D. kilograms.
9. Which of the following quantities is not measured as length?
 - A. Distance between two cities
 - B. Depth of well
 - C. Girth of a tree
 - D. Wool in a ball.
10. Weather department estimates the hottest and the coldest day on the basis of
 - A. day on the basis of temperature of the day.
 - B. length of the day.

- C. time of sun rise.
- D. time of sun set.

SA

11. Name ten different things of daily use that are measured when you buy these from the market and write the units in which these are measured.

Concept II : Standard units of measurement are essential for the sake of uniformity.

Tools of Evaluation : Fill in the blank

MCQs, SA

Fill in the blanks

1. The standard unit of length is _____.
2. The standard unit of mass is _____.
3. The standard unit of time is _____.
4. Laboratory thermometer measures temperature in _____ units.
5. Standard units of measurement are essential for the sake of _____.

MCQs

6. Width of your classroom measured by you and your friend who is taller than you, in terms of footsteps would be
 - A. equal and comparable.
 - B. equal and uncomparable.
 - C. unequal and comparable.
 - D. unequal and uncomparable
7. The width of a window measured by three boys Ram, Shyam and Mohan in terms of cubits was found to be 3, 4 and 5. The width of the window would be conveyed to the carpenter as
 - A. 3 cubits.
 - B. 4 cubits.
 - C. 5 cubits.
 - D. none of the above.
8. Which of the following expressions is the proper measure of the hotness of water?
 - A. Very hot
 - B. 80°C
 - C. hot
 - D. warm.

9. Ram started doing his homework at 7 P.M. and completed at 8.00 P.M. The time taken by Ram in completing the homework can be best expressed as
- A. 7 P.M. to 8 P.M.
 - B. 1 hour
 - C. $\frac{1}{24}$ of a day.
 - D. 3,600 seconds.

SA

10. Explain with the help of two examples the necessity of standard units of measurement.
11. Explain the need of sub and multiple units of
- (a) length.
 - (b) mass.

Concept III : Proper measurement of length can be made with the help of various types of measuring devices such as a ruler, a measuring tape etc. which read length in metre or in sub-units, millimetre and centimetre. Larger units such as kilometres are needed to express large lengths.

Tools of Evaluation: Fill in the blanks, MCQs

Fill in the blanks

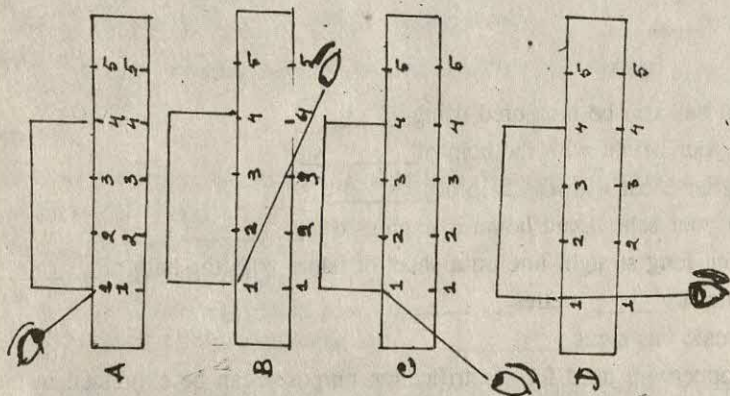
1. The diameter of a ball can be measured using _____.
2. Doctor measures your height with the help of _____.
3. Tailor measures your chest with the help of _____.
4. Distance between your school and home is expressed in _____.
5. You draw a 10 cm. long straight line on a sheet of paper with the help of _____.
6. 1 kilometre is equal to _____ metres _____.
7. A correct metre scale has signs _____.
8. Thickness of a copperwire used for electrification purposes can be expressed in the unit of _____.
9. 1 metre is equal to cms.

10. MCQs

Which of the following is the standard unit of length?

- A. Metre
- B. Centimetre
- C. Kilometre
- D. Decimetre

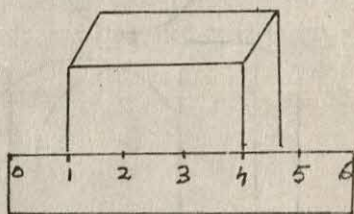
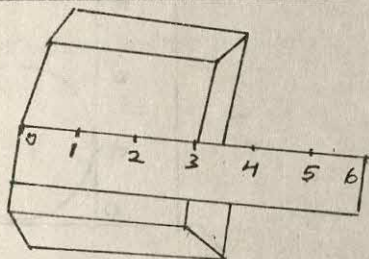
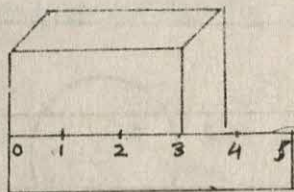
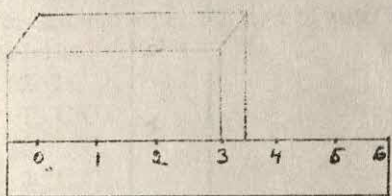
11. Which of the following units is used to express the chest expansion?
- Millimetre
 - Decimetre
 - Centimetre.
 - Metre.
12. If thickness of 10 five paise coin stack is 10 cm. the thickness of one coin would be
- 1 cm.
 - 1 dm.
 - 1 mm.
 - 1 m.
13. Which of the following is the correct eye position to measure the length of a piece of paper?



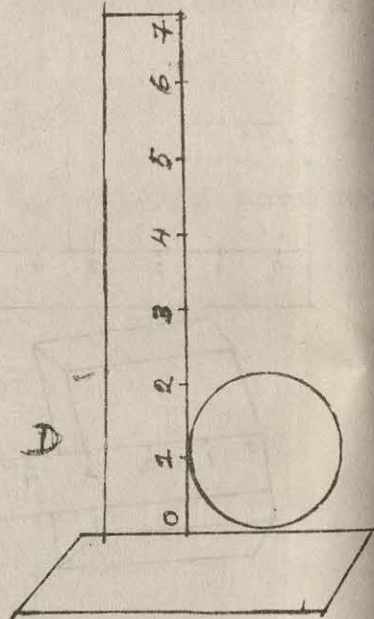
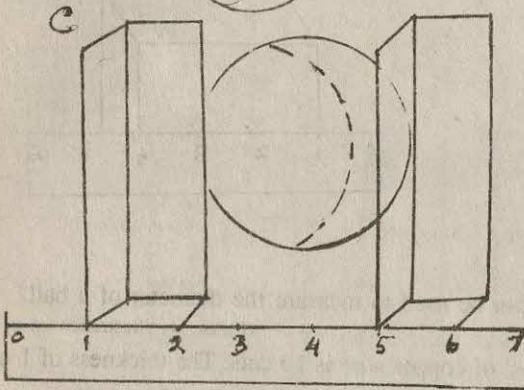
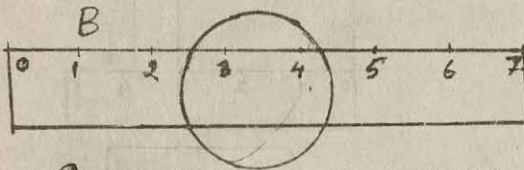
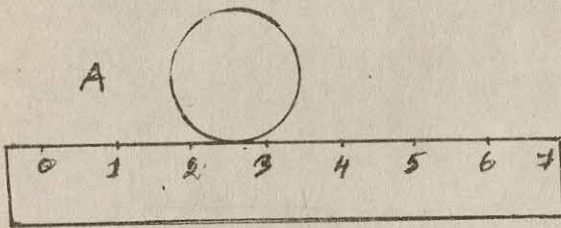
14. A metre scale with broken edge does not show zero reading. This scale was used to measure the length of a piece of paper. The scale reading at one end of the paper is 1.0 cm and at the other end is 5.5 cm. The length of this paper is
- 5.5 cms.
 - 4.5 cms.
 - 6.5 cms.
 - 0.2 cms.

MEASUREMENT

15. Which of the following is the correct position of the scale when used to measure the length of the wooden block?



16. Which of the following arrangements can be used to measure the diameter of a ball?
(Please see illustration on p. 62)
17. The length of a coil containing 25 'turns' of copper wire is 10 cms. The thickness of 1 turn of copper wire is
- 40 millimetres.
 - 2.5 metres
 - 2.5 cms.
 - 4.0 mm.
18. Height of Ram is 1.5 metres and that of Shyam is 160 cms. Mohan is 1 metre and 70 cms tall. Which of the following statements is correct?
- Mohan is taller than Ram and Shyam.
 - Shyam is taller than Ram and Mohan.
 - Ram is shorter than Mohan and taller than Shyam.
 - Shyam is shorter than Ram and taller than Mohan.



19. The distance between Delhi and Bombay is expressed in the units of
- Kilometres.
 - Metres.
 - Centimetres.
 - Millimetres.

Concept IV : Area and volume are derived quantities of length.

Tools of Evaluation: Fill in the blanks, MCQ, S.A.

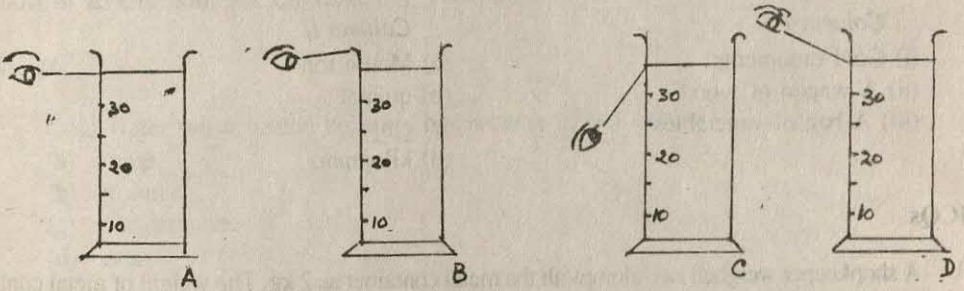
Fill in the blanks

- Area of the classroom floor = Length + _____.
- Area of a field is expressed in the units of _____.

3. The volume of petrol at petrol pump is measured in the _____ of _____.
4. The volume of cuboid is length _____ + _____.
5. The volume of matchbox is expressed in units of _____.
6. 1 litre = _____ C.C.
7. The volume of irregular solids, insoluble in water can be measured by using a _____.

MCQ

8. The level of water in a measuring cylinder is 10 ml. When a small piece of solid is fully immersed into water, the level of water in the measuring cylinder rises to 20 ml. The volume of solid is
 - A. 2 C.C.
 - B. 10 C.C.
 - C. 20 C.C.
 - D. 30 C.C.
9. The correct eye position for measuring the level of liquid in a graduated cylinder is



SA

10. Explain how would you measure the surface area of a leaf.
11. State the precautions that you would follow while determining the volume of liquid using a graduated cylinder.
12. Define the capacity of a container.
13. Suggest a method to find the volume of a cork.

Concept V: Mass is the measure of the quantity of matter.

Tools of Evaluation: Fill in the blanks, Matching type, MCQs, S.A.

Fill in the blanks

- (1) The measure of the quantity of matter is _____.
- (2) A bucket filled with water feels heavier than an empty bucket because of the _____ of water.
- (3) The standard unit of mass is _____.
- (4) 1 gm. is equal to _____ milligrams.
- (5) 1 quintal is equal to _____ kilograms.
- (6) Large quantities of coal are expressed in the units of _____.
- (7) Balances and weights of shopkeepers should have the stamp of _____.
- (8) To weigh one kg. of rice, fix the weight and vary the quantity of rice till the beam is _____.

Matching Type

- (9) Match the masses of the objects in column I with their practical units in column II

Column I

- (i) Gold ornaments
- (ii) A wagon of wood
- (iii) A bag of vegetables

Column II

- (a) Metric ton
- (b) quintal
- (c) gms
- (d) kilograms

MCQs

10. A shopkeeper weighed rice along with the metal container as 2-kg. The weight of metal container is 300 gms. The actual mass of rice weighed is.
A. 500 g.
B. 2,300 g.
C. 2 kg.
D. 1.7-kg.
11. If 1cm^3 of water weighs 1gm, then the mass of water in a tank of length 40 cms., breadth 20 cms. and height 10 cms. is
A. 2 kg.
B. 4 kg.
C. 8 kg.
D. 1 kg.

12. A gold ring when melted weighs 2 gms., it is found to contain 0.5 gms of copper as impurity. The mass of gold contained in melting ring is
- 1.5 gm.
 - 15 mg.
 - 15 gms.
 - 150 mg.
13. The weight of one bag of rice is 10 kg. The weight required on another side of the balance to make the beam horizontal is
- 10 kg.
 - 1 quintal
 - 100 g.
 - 1,000 g.

SA.

14. What specific points would you check to ensure that a beam balance is correct?
15. Why is it necessary to measure accurately? Explain with the help of two examples.

Concept VI: Temperature is the measure of the degree of hotness and is measured in degree celsius.

Tools of Evaluation: MCQs, Matching Type, S.A.

MCQs

- Cold water when heated becomes hot because of increase in
 - mass.
 - volume.
 - temperature.
 - area.
- The graduation on a clinical thermometer is from
 - 0°C to 100°C .
 - 35°C to 100°C .
 - 0°C to 110°C .
 - 35°C to 42°C .
- The normal body temperature is
 - 0°C .
 - 35°C .
 - 37°C .
 - 42°C .

4. The temperature of the body when measured with a clinical thermometer is the reading coinciding with the
 - a) upper fixed end of the thermometer.
 - b) lower fixed end of the thermometer.
 - c) difference between the upper and lower fixed ends of the thermometer.
 - d) tip of the mercury thread.
5. The temperature of water can be measured with the help of
 - (a) oven thermometer.
 - (b) laboratory thermometer.
 - (c) maximum and minimum thermometer.
 - (d) metal thermometer.
6. The lower fixed point in laboratory thermometer is the
 - (a) melting point of ice.
 - (b) boiling point of water.
 - (c) melting point of mercury.
 - (d) boiling point of mercury.
7. Thermometer tube contains.
 - (a) water.
 - (b) silver.
 - (c) mercury.
 - (d) lead.
8. Temperature of three liquids A, B and C contained in three separate test tubes was measured with the help of a laboratory thermometer. The reading coinciding with mercury thread was 69°C , 84°C and 92°C in test tubes A, B & C respectively. Which of the following interpretations is correct?
 - (a) Liquid B is hottest of the three.
 - (b) Liquid A is hotter than liquid B but cooler than liquid C.
 - (c) Liquid B is hotter than liquid A but cooler than liquid C.
 - (d) Liquid C is hotter than liquid A but cooler than liquid B.
9. The room temperature recorded at 7 A.M. on 1 June, 1988 was 30°C and the temperature recorded at 1 P.M. was found to be 44°C . The rise in temperature till 1 P.M. was
 - (a) 14°C .
 - (b) 30°C .
 - (c) 44°C .
 - (d) 74°C .
10. Temperature of a candle flame can be measured with the help of
 - a) clinical thermometer.

- b) oven thermometer.
- c) maximum and minimum thermometer.
- d) laboratory thermometer.

Matching Type

11. Match the temperature given in column I with the type of thermometer in column II

Column I

- (i) Temperature of furnace
- (ii) Temperature of body
- (iii) Melting point of copper
- (iv) Melting point of ice
- (v) Variation in Day's temperature

Column II

- (a) Clinical thermometer
- (b) Metal thermometer
- (c) Oven thermometer
- (d) Laboratory thermometer
- (e) Maximum-Minima thermometer

12. Match the temperature given in column II with the entries given in column I

Column I

- (i) Lower fixed point of laboratory thermometer
- (ii) Upper fixed point of clinical thermometer
- (iii) Normal body temperature
- (iv) Boiling point of water

Column II

- (a) 37°C
- (b) 0°C
- (c) 42°C
- (d) 100°C

S.A.

- 13. Describe the method of measuring body temperature and state the precautions you would take while measuring the body temperature.
- 14. Show diagrammatically the construction of oven thermometer and laboratory thermometer.

Concept VII: The principle of periodic motion is used in measuring time.

Tools of Evaluation: MCQs, Student records, Fill in the blanks.

MCQs

- 1. In olden days villagers used to estimate time with the help of
 - A. wrist watch.
 - B. stop clock.
 - C. shadow of a wall.
 - D. chirping of birds.

2. In olden days the age of a man was estimated by
 - A. the phases of moon.
 - B. height of man.
 - C. motion of stars
 - D. number of seasons passed.
3. Which of the following can be used to make the standard time measuring device?
 - A. Vibrating pendulum.
 - B. Rotation of Earth about the Sun.
 - C. Rotation of Earth about its own axis.
 - D. Filling of bucket with water.
4. The standard unit of time is
 - A. hour.
 - B. minute.
 - C. second.
 - D. day.
5. In Jantar Mantar at Delhi, time can be measured with the help of
 - A. planetary arrangement.
 - B. sun dial.
 - C. shadow of the monument.
 - D. water fountain.
6. In annual school sports, the time of 200 metre race is measured by
 - A. wrist watch.
 - B. beats of a drum.
 - C. stop watch.
 - D. clapping with hands.
7. Which of the following is not a periodic event?
 - A. Sunrise.
 - B. Chirping of birds.
 - C. Aging.
 - D. Rotation of Earth round its own axis.
8. Which of the following principles is used in making wall clocks ?
 - A. periodic events.
 - B. periodic motion.
 - C. seasonal changes.
 - D. continuous motion.

Fill in the blanks

9. 60 seconds is equal to _____ minute.
10. 1 hour is equal to _____ seconds.
11. 24 hours is equal to _____ day
12. 1 day is equal _____ to minutes
13. 1 year is equal to _____ hours.
14. Time taken by a pendulum to swing from one side to another is _____.
15. _____ is a periodic event.
16. Periodic motion of _____ is used to measure time interval in watches.
17. Events which are repeated regularly are called _____.
18. The water clock is based on the principle of _____.
19. **Students Record:** Students may be asked to note down time for doing some specific tasks e.g. running 100 metres; they may also be asked to record events per minute e.g. number of times one breaths in one minute, pulse per minute, etc. Teacher may check that students can measure time accurately.

Changes Around Us

S.No.	Concepts	Skills/Competencies	Specific tasks/behaviours	Tools of Evaluation
1	2	3	4	5
I.	Things and phenomenon around us change their position, shape, size, colour, state, temp. composition and structure due to various causes.	Observes changes in phenomenon and things in everyday life.	<p>Lists changes in phenomenon such as change of day and night, sudden change in rainfall, melting of ice, rusting of iron etc. that he observes in everyday life.</p> <p>Performs simple experiments such as changing ice into water, evaporation of water and drying of clothes and find that these changes occur due to rise in temp.</p>	S.A., fill in the blanks, matching type.
II.	Changes are of various kinds such as slow-fast, desirable-undesirable, periodic-non-periodic, reversible-irreversible; physical and chemical.	Classifies various changes as slow-fast, desirable-undesirable, periodic-non-periodic, reversible-irreversible, physical and chemical.	<p>Performs experiments and observes changes such as burning of matchstick; dissolving sugar into water; spinning a top; formation of day and night; rusting of iron; change of season and observes that the time taken by each change is not the same.</p> <p>Classifies changes as slow and fast. Gives examples of slow changes and fast changes.</p>	S.A., fill in the blanks, MCQs, matching type.

1	2	3	4	5
			Gives examples of changes that are undesirable such as spoiling of food stuff, burning of house, breaking of glass tumbler.	
			Gives examples of changes that are desirable such as formation of curd and formation of manure.	
			Compares the desirability and undesirability of a change such as burning of fuel in different situations.	
			Names the month of the year in which rainfall, summer and winter occur.	
			Gives examples of changes which do not occur every year such as earthquake, volcanoes and eruption.	
			Compares periodic and non-periodic changes.	
			Classifies changes as reversible and irreversible.	
			Gives examples of reversible and irreversible changes.	

1	2	3	4	5
			<p>Performs simple experiments such as changing of ice into water and back water into ice, burning of paper into ashes.</p> <p>Observes that conversion of ash into paper is not possible.</p> <p>Performs simple experiments such as stretching a rubber band, breaking a piece of chalk, breaking a wooden piece and dissolving sugar into water.</p> <p>Compares the properties of the substances before and after the change.</p> <p>Infers that some changes cause change in physical properties whereas others result in change of chemical properties of the substances.</p> <p>Gives examples of physical and chemical changes.</p>	
III.	Changes involve interaction	Hypothesises that interaction of substances causes change.	<p>Performs simple experiments such as dissolving sugar into water, separating iron fillings with a magnet.</p> <p>In some changes interacting substances change their properties whereas in others the interacting substances do not change their properties.</p>	<p>Fill in the blanks, true/false, S.A, student record.</p>

1

2

3

4

5

IV. Changes involve

energy.

- (a) Hypothesises that change in energy leads to changes.
 (b) Appreciates that some changes can be controlled by controlling energy.

Performs simple experiments such as dissolving quick lime in water, dissolving ammonium chloride in water.

Infers that in some changes energy is evolved and in some changes energy is absorbed.

Which of the following is a slow change?

- A. Burning of fuel.
 B. Cooking of rice.
 C. Breaking of glass tumbler.
 D. Dissolution of sugar into water.

(A) Slow and fast changes

Tools of Evaluation: 2A. Fill in the blanks, MCQs, Matching type.

Concept II: Changes are of various kinds such as slow-fast, desirable-undesirable, reversible-irreversible, physical and chemical.

- (i) Change in composition
 (ii) Change in colour
 (iii) Change in state
 (iv) Change in size

Column A
 Changes

- (a) Heating water to 100°C
 (b) Dissolution of sugar into water
 (c) Setting of lime
 (d) Freezing of water
 (e) Heating of iron to 1000°C

Matching Type

Match the changes given in column A with the nature of change in column B.

List ten changes that you observe in day to day life.

Fill in the blanks:

- Complete the following sentences by writing appropriate words in the blanks.
 (a) Ice when heated, is converted into _____.
 (b) A piece of paper, when burnt, changes to _____.
 (c) Formation of curd from milk is a change because _____.
 (d) Breaking of block causes change in _____ of wood block.
 (e) Filling of air in balloon changes _____ of the balloon.

Tools of Evaluation: 2A. Fill in the blanks, Matching type.

2A.

Concept I: Things and phenomena around us change their position, shape, size, colour, temperature, composition and structure due to various causes.

A SCHEME OF FORM

Concept I: Things and phenomena around us change their position, shape, size, colour, state, temperature composition and structure due to various causes.

Tools of Evaluation: S.A. Fill in the blanks, Matching type.

S.A.

- List ten changes that you observe in day to day life.
- Fill in the blanks:
complete the following sentences by writing appropriate words in the blank space provided.
 - Ice, when heated, is converted into_____.
 - A piece of paper, when burnt, changes to_____.
 - Formation of curd from milk is a change because_____of milk changes.
 - Breaking of block causes change in_____of wood block.
 - Filling of air in balloon changes_____of the balloon.

Matching Type

- Match the changes given in column A with the nature of change given in column B.

Column A
Changes

Column B
Nature of Change

- | | |
|-------------------------------------|----------------------------|
| (a) Heating water to 100°C. | (i) Change in composition. |
| (b) Dissolution of sugar into water | (ii) Change in colour |
| (c) Setting of sun | (iii) Change in state |
| (d) Stretching of string | (iv) Change in size |
| (e) Heating of Iron to 1000°C. | |

Concept II: Changes are of various kinds such as slow-fast, desirable-undesirable, periodic-nonperiodic, reversible-irreversible, physical and chemical.

Tools of Evaluation: SA, Fill in the blanks, MCQs, Matching type.

MCQs

(A) *Slow and fast changes*

- Which of the following is a slow change?
 - Burning of fuel.
 - Cooking of rice.
 - Breaking of glass tumbler.
 - Dissolution of sugar into water.

5 Give five examples of slow change and five examples of fast change.

6. Classify the following changes as slow or fast change.

- (a) Burning of paper.
- (b) Rusting of iron.
- (c) Ripening of fruits.
- (d) Change of day and night.
- (e) Melting of ice.
- (f) Burning of agarbati.
- (g) Spinning of a top.
- (h) Earthquake.
- (i) Dissolution of salt into water.

(B) *Desirable and undesirable changes*

7. Complete the following sentences by writing five to ten words, in the blank space provided.

- (a) Formation of manure from cowdung and dead plants is a desirable change because_____.
- (b) Cutting of trees is undesirable change because_____.
- (c) Leakage of gases from factories is an undesirable change because_____.
- (d) Rainfall is a desirable change because_____.
- (e) Flooding of river is an undesirable change because_____.

8. State three changes which can be desirable as well undesirable in different situations. Justify in 2-3 sentences that these changes are desirable in one situation and undesirable in another situation.

(C) *Periodical and non-periodical changes.*

9. Which of the following is a nonperiodic change?

- A. Day and night.
- B. Summer and winter.
- C. Heart beat.
- D. Falling of Papaya tree leaves.

10. Which of the following is a periodic change?

- A. Falling of trees.
- B. Oscillation of a clock pendulum.
- C. Land slides.
- D. Sudden change in weather.

11. Give five examples of periodic changes and five examples of non-periodic changes.

(D) Reversible and irreversible changes

12. Classify the following changes as reversible or irreversible and justify in one to ten words the reason for classifying a change as reversible or irreversible.

- (a) Rusting of iron.
- (b) Melting of wax.
- (c) Dissolution of salt in water.
- (d) Ripening of fruits.
- (e) Decay of plants.
- (f) Changing of milk into curd.
- (g) Raining.
- (h) Falling of tree leaves.
- (i) Ageing.
- (j) Train accident.

13. Give five examples of reversible changes and five examples of irreversible changes.

14. Which of the following is a reversible change?

- A. Burning of wood to ashes.
- B. Conversion of water to steam.
- C. Breaking of glass tumbler.
- D. Growth of plant.

15. Which of the following is an irreversible change?

- A. Dissolution of sugar in water.
- B. Melting of ice into water.
- C. Explosion of bomb.
- D. Stretching of rubber band.

(E) Physical and chemical changes

16. Which of the following is a chemical change?

- A. Melting of wax.
- B. Conversion of ice into water.
- C. Burning of wood.
- D. Breaking of wooden block.

17. Which of the following is a physical change?

- A. Rusting of iron.
- B. Melting of ice.
- C. Burning of agarbatti.
- D. Cooking of food.

18. Complete the following sentences in 5-10 words.

- Adding of vinegar to baking soda is a chemical change because _____.
- Moving of electric fan is a physical change because _____.
- Adding water to quick lime produces a chemical change because _____.
- Burning of paper is a chemical change because _____.
- Formation of water from hydrogen and oxygen is a chemical change because _____.
- Glowing of electric bulb is a physical change because _____.
- Formation of clouds is _____ a change.
- Formation of seed from flower is a _____ change.
- Changes in which a new substance is formed are called _____.

19. Match the changes listed in column A with the types of changes listed in column B.

Column A

- Rusting of iron.
- Formation of water from hydrogen and oxygen
- Glowing of electric bulb.
- Breaking of glass tumbler.

Column B

- Desirable, chemical, fast, reversible.
- Undesirable, chemical, slow, irreversible.
- Undesirable, physical, fast, irreversible.
- Desirable, physical, reversible.

20. Solid A on heating with liquid B produces a gas C, which is lighter than air. This is a chemical change because

- the state of reactants changes.
- volume of the reactants changes.
- composition of the reactants changes.
- temperature of the reactants changes.

Concept III: Changes involve interaction.

Concept IV: Changes involve energy.

Tools of Evaluation: Fill in the blanks, True/False, S.A., Student Record.

- Indicate whether energy is evolved or absorbed in each of the following changes.
 - When ammonium chloride is dissolved in water.
 - When alcohol is dissolved in water.
 - When hands (palms) are rubbed.
 - When quicklime is added to water.
 - When electric bulb glows.
- Indicate the nature of energy associated with each of the following reactions.
 - Working of a dry cell.

- (b) Rotation of electric fan.
- (c) Lifting of weight with hands.
- (d) Bursting of crackers.
- (e) Lightening during the rainy season.

3. Fill in the blanks.

- (a) In a burning candle, interaction takes place between _____ and _____.
- (b) In cutting wood, interaction takes place between _____ and _____.
- (c) In conversion of ice into water, there is interaction between _____ and _____.
- (d) When we cut a fruit with a knife, the interaction takes place between _____ and _____.
- (e) When an electric fan moves, the interaction takes place between _____ and _____.

4. State whether the following statements are true or false. Also correct the false statements.

- (a) All chemical changes result in evolution of energy.
- (b) In ripening of fruits energy is absorbed.
- (c) In preparation of food by plants using CO_2 energy is evolved.
- (d) In burning of match-stick, energy is absorbed.
- (e) If you put glucose on tongue it feels cool because energy is evolved.
- (f) Every change involves energy in one form or the other.

5. Justify the following statements, giving two examples of each.

- (a) The nature of change depends on the kind and extent of interaction involved between reactions.
- (b) A change cannot take place without the involvement of energy.
- (c) Changes are classified as physical or chemical depending on the properties of the resulting products.
- (d) Some undesirable changes can be avoided.
- (e) A change always has some cause which brings it about.

6. Perform following simple experiments at home and record the nature of change in terms of slow-fast, reversible-irreversible and physical-chemical.

- (a) Add lemon juice to turmeric powder.
- (b) Dissolve detergent powder in water.
- (c) Hit ball with a bat.
- (d) Switching on a radio.
- (e) Plucking a flower from plant.

7. Teacher may evaluate student's record and guide him wherever necessary.

Motion, Force and Machines

S.No.	Concepts	Skills/Competencies	Specific tasks/Behaviours	Tools of Evaluation
1	2	3	4	5
I.	<p>Motion is the change of position of objects with time. Motion may be linear, circular, oscillatory, periodic, random or any of their combination.</p>	<p>Understands the concept of motion</p> <p>Recognizes various types of motions such as linear, motion, circular motion, periodic motion, oscillatory motion and random motion.</p>	<p>Observes and lists objects in motion such as kites, buses, aeroplanes and boats.</p> <p>Distinguishes between different kinds of motions.</p> <p>Lists objects having linear motion circular, periodic motion, oscillatory motion, random motion.</p> <p>Illustrates various types of motions with the help of examples from daily life, e.g. periodic motion of clock and sun, linear motion of ball, oscillatory motion of drum.</p> <p>Demonstrates that some objects like bicycle, wheel of screw show more than one type of motion.</p>	<p>MCQs, Matching type</p>
II.	<p>Speed is the rate of change of distance travelled by the moving object.</p>	<p>Establishes the relationship between speed, distance and time.</p> <p>Applies knowledge of speed to find the speed, distance or time taken by the moving vehicle/object.</p>	<p>Discriminates between various types of motions.</p> <p>Derives the relationship between speed, distance and time from concrete examples.</p> <p>Calculates speeds of moving objects.</p> <p>Calculates distance travelled when speed and time are given.</p>	<p>MCQs, fill in the blanks</p>

1	2	3	4	5
			<p>Calculates time taken when speed and distance travelled are given.</p> <p>Compares speed/distance travelled/time taken by two objects.</p> <p>Explains meaning of sign boards 'speed limit 60 KM/hour' etc.</p> <p>Defines Force</p> <p>Cites examples from every day life where push is needed to do a work e.g. opening a door, throwing a ball.</p> <p>Cites examples from everyday life where pull is required to do a work e.g. carrying a bucket of water, books etc.</p> <p>Observes that effect of force changes the state of an object e.g.; shape of tomato when pressed; speed of object when pushed; direction of smoke when air is blown from opposite direction etc.</p> <p>Lists the changes observed in the state of an object and the nature of force applied.</p>	MCQs, SA
III.	<p>Force is the push or pull on an object that may of the object such as speed, shape, bring a change in direction, etc.</p> <p>the state of the object on the basis of observations that force has a magnitude and direction.</p>			

1	2	3	4	5
IV	Forces are of different types such as Muscular Force, Magnetic Force, Electrostatic force, Gravitational Force, Frictional Force	Develops awareness and comprehension of different types of forces. Applies knowledge of different types of forces to solve day-to-day problems	<p>Cites examples from everyday life where each of the following type of force is needed to do a work</p> <ul style="list-style-type: none"> —muscular force —magnetic force —electrostatic force —frictional force. —gravitational force <p>Distinguishes between different types of forces.</p> <p>Defines and illustrates muscular force, magnetic force, electrostatic force, gravitational force and frictional force.</p> <p>Observes the friction between two rough or smooth surfaces.</p> <p>Observes how friction changes by changing the smoothness of surfaces (lubrication, ball bearings, rolling a ball on rough and smooth surface.)</p> <p>Cites examples where friction is useful.</p> <p>Cites examples from everyday life where friction is harmful.</p> <p>Suggests methods to decrease friction.</p> <p>Suggests methods to increase friction.</p>	MCQ, Matching Type
V.	Friction is an opposing force on a moving body.	Recognizes that friction depends upon the nature and smoothness of the surface of the bodies in contact. Appreciates the role played by friction in daily life. Applies the knowledge of friction to design-techniques of reducing or increasing friction in order to solve day-to-day problems.		MCQ, True false, SA

1	2	3	4	5	
VI.	Machines make work easier and faster.	<p>Recognizes that a work requiring greater force can be done by applying less force with the help of machines.</p> <p>Recognizes that machines can change the direction of force.</p> <p>Develops skill of using simple machines.</p>	<p>Names some simple machines that he uses in his daily life.</p> <p>Demonstrates that less force is required to do a work with the help of a machine than without a machine e.g. lifting weight with the help of wheel requires less force than without it.</p> <p>Demonstrates that machines can change the direction of force e.g. pulleys.</p> <p>Illustrates with examples from daily life that machines make work easier and faster.</p> <p>Makes appropriate use of machines in daily life.</p>	MCQ, VSA, SA, Matching Type.	
VII.	<p>There are various types of simple machines e.g. lever pulley, inclined plane and wheel. Some machines are inclined plane etc.</p> <p>complex such as a bicycle, a sewing-machine, a tractor etc.</p>	<p>Distinguishes between simple and complex machines.</p> <p>Identifies simple machines.</p> <p>Understands principle of working of simple machines e.g. levers, pulleys, wheel inclined plane etc.</p> <p>Develops awareness that most of the machines are combination of many simple machines.</p>	<p>Cites examples of simple and complex machines from daily life.</p> <p>Observes working of some simple machines and recognizes the principle of each of these machines.</p> <p>Analyses the situations where each of these simple machines—levers, pulleys, wheels and inclined planes are used.</p> <p>Lists functions of each of these simple machines and identifies the situations where these can be used.</p>	MCQ, SA	

1	2	3	4	5
VIII.	Machines require proper care and maintenance.	Appreciates that proper care and maintenance is essential for longer life and efficiency of machines.	Distinguishes between three types of levers in action in his daily life.	
		Understands the steps necessary for the proper maintenance of simple machines.	Observes in his daily life that machines are oiled to reduce friction, cleaned to remove dust and are also kept covered to protect from dust, paint is applied to machines to avoid rusting. Lists all such steps.	VSA, fill in the blanks, SA.
			Lists various steps that should be followed for proper working and maintenance of simple machines.	

Concept I: Motion is the change of position of objects with time. Motion may be linear, circular, oscillatory, periodic, random or any of their combination.

Tools of Evaluation: MCQs, Matching Type

MCQ

1. Which of the following objects is stationary as compared to you?
 - A. An aeroplane
 - B. The swing
 - C. A crow
 - D. Table.
2. Which of the following objects is in motion as compared to you?
 - A. Table
 - B. Chair
 - C. Fan
 - D. Room
3. Which of the following is *not* a circular motion?
 - A. Motion of the earth round the sun.
 - B. Motion of the moon round the earth.
 - C. Motion of clock pendulum.
 - D. Motion of the seconds hand of a watch.
4. Which of the following motions is periodic?
 - A. Motion of the earth around the sun.
 - B. Motion of an athlete in a circular track.
 - C. Motion of the cycle wheel.
 - D. Motion of a dancing girl.
5. Which of the following is a linear motion?
 - A. A bull moving round a central pole.
 - B. Pendulum of a clock.
 - C. Motion of moon round the earth.
 - D. A bullet fired from a rifle.
6. Which of the following is a random motion?
 - A. Motion of the cycle wheel.
 - B. Movement of bus on the road.
 - C. Boy playing football.
 - D. An athlete in 400 metre race.

7. Which of the following is not a circular motion?
 - A. Motion of moon round the earth.
 - B. Motion of earth round the sun.
 - C. Motion of earth on its own axis.
 - D. Motion of birds in sky.
8. Which of the following is an oscillatory motion?
 - A. Boy playing cricket.
 - B. The seconds-hand of watch.
 - C. String of a violin.
 - D. Birds flying in sky.

Matching Type

9. Match the motions given in column A with the objects given in column B.

Column A

- (a) Oscillatory motion.
- (b) Circular motion
- (c) Linear motion
- (d) Periodic motion
- (e) Random motion.

Column B

- (i) Motion of a fly
- (ii) Motion of a fired bullet.
- (iii) Motion of a swing
- (iv) Motion of earth on its own axis

10. Explain the term 'motion' giving three examples from daily life.

Concept II: Speed is the rate of change of distance travelled by the moving object.

Tools of Evaluation: MCQs, Fill in the blanks.

MCQs

1. Choose the correct relation
 - A. distance = speed \times time.
 - B. distance = $\frac{\text{speed}}{\text{time}}$
 - C. distance = $\frac{\text{time}}{\text{speed}}$.
 - D. distance = speed \cdot time.
2. Speed of 72 km/hour is equal to
 - A. 20m/sec.

- B. 20m/min.
- C. 1 km/min.
- D. 1200m/sec.

3. How much distance will be covered by a boy in 5 seconds running at the speed of 10 metres/sec.?
- A. 2 metres
 - B. 50 metres
 - C. 50 centimetres
 - D. 2 kilometres.
4. A boy walks at the speed of 10m/sec. How much time will be taken by him to cover a distance of 100 metres?
- A. 10 seconds
 - B. 10 minutes
 - C. 1/10 minute
 - D. 1/10 hour.
5. The standard unit of speed is
- A. km/hr.
 - B. m/min.
 - C. m/sec.
 - D. cm/sec.
6. Train A travelled 120 kms in three hours, train B travelled 90 kms in two hours, train C travelled 120 kms in four hours. Which of the following statements is correct?
- A. Train A moved faster than trains B and C.
 - B. Train B moved faster than trains A and C.
 - C. Train C moved faster than train A and slower than train B.
 - D. Train B moved faster than train A and slower than train C.
7. A car travelled at the speed of 60 km/hr and a train travelled at the speed of 80 km/hr. Car took 4 hours to reach Agra from Delhi whereas train reached Agra in 3 hrs starting from Delhi. The distance between Delhi and Agra is
- A. 240 kms by train and 15 kms by car.
 - B. 240 kms by car and 20 kms by train.
 - C. 240 kms by train and 240 kms by car.
 - D. 27 kms by train and 15 kms by car.
8. Two cars A and B are travelling at the same speed of 60 kms/hr. Car A has to cover 120 kms to reach Delhi whereas car B has to cover 90 Kms. to reach Delhi. Which of these two cars will reach Delhi earlier and by what time margin?
- A. Car A will reach 30 minutes earlier.

- B. Car B will reach $3\frac{1}{2}$ hrs. earlier.
- C. Car A will reach $3\frac{1}{2}$ hrs. earlier.
- D. Car B will reach 30 minutes earlier.

Concept III: Force is the push or pull on an object that may bring a change in the state of the object.

Tools of Evaluation: SA, MCQs

SA

1. Give three examples from everyday life where push produces motion.
2. Give three examples from everyday life where pull produces motion.
3. Illustrate with the help of examples that force produces change in the speed, direction and shape of the objects.

MCQs

4. Which of the following characteristics of an iron nail changes on hammering?
 - A. Shape.
 - B. Weight.
 - C. Colour.
 - D. M.pt.
5. The wind blowing opposite to your direction of walking, produces change in your
 - A. speed.
 - B. direction.
 - C. weight.
 - D. shape.
6. When force is applied in the direction of motion,
 - A. speed of motion increases.
 - B. speed of motion decreases.
 - C. direction of motion changes.
 - D. no change is produced.
7. When a moving cart is pulled from opposite direction the
 - A. speed of cart increases.
 - B. speed of cart decreases.
 - C. direction of cart changes.
 - D. change is produced.

8. Which of the following changes are produced when a string is stretched?
- Shape
 - Weight
 - Colour
 - Material.
9. The direction of a moving object can be changed by
- increasing speed of motion.
 - decreasing speed of motion.
 - applying force in opposite direction.
 - applying force in the direction of motion.
10. Direction of smoke of chimney changes when wind flows
- in the direction opposite to smoke.
 - in the direction of smoke.
 - with fast speed.
 - with slow speed.
11. If a force is applied in a direction opposite to the direction of motion, the speed
- increases.
 - decreases.
 - remains unchanged.
 - becomes zero.

Concept IV: Forces are of different types such as (a) muscular force, (b) magnetic force, (c) electrostatic force, (d) gravitational force, (e) frictional force.

Tools of Evaluation: MCQs, Matching type, Short Answer.

MCQs

1. When a rubbed comb is brought near tiny pieces of paper, the pieces of paper start moving towards comb because of
- friction between comb and papers.
 - weight of comb.
 - electrostatic force.
 - muscular force.
2. The weight of a body is due to
- matter contained in the body.
 - earth's pull on the body.
 - shape of the body.
 - friction between body and earth.

3. The mangoes fall down from tree due to
 - A. gravitational force.
 - B. electrostatic force.
 - C. frictional force.
 - D. magnetic force.
4. Which of the following appliances make use of magnetic force?
 - A. An electric bell
 - B. Water filter
 - C. An electric heater
 - D. A gas burner.
5. What kind of force is used in pulling a rikshaw by man?
 - A. Gravitational
 - B. Muscular
 - C. Electrostatic
 - D. Magnetic.
6. Which of the following is an example of electrostatic force?
 - A. Removing iron wastes with the help of magnet.
 - B. Movement of pieces of paper towards rubbed plastic ball-pen.
 - C. Child falling from tree.
 - D. Child slipping on a banana stem.
7. Which of the following is not an example of gravitational force?
 - A. Pulling a rickshaw
 - B. Falling of tree leaves
 - C. Divers diving into swimming pool
 - D. Child falling from top of roof.
8. Which of the following activities are facilitated by friction?
 - A. Writing on paper
 - B. Walking on floor
 - C. Pushing weight on floor
 - D. Riding bicycle on road.
9. Which of the following is *not* an example of muscular force?
 - A. Bullock pulling a cart.
 - B. Child running with school bag.
 - C. Child memorizing poems.
 - D. Child throwing ball.

Matching type

10. Match the types of forces in column I with their actions in column II.

*Column I**Column II*

- (a) Muscular force
- (b) Gravitational force
- (c) Frictional force
- (d) Magnetic force
- (e) Electrostatic force

- (i) Iron pins attracted by a magnet.
- (ii) Ball rolling on ground comes to rest.
- (iii) Movement in the fibres of the feather due to rubbing.
- (iv) Lifting of bucket with hand.
- (v) Diver dives into a swimming pool.

- 11. Name four tasks where you use muscular force.
- 12. Write four applications of magnetic force.
- 13. Distinguish between electrostatic force and magnetic force with the help of one example each.
- 14. Why is it difficult to walk on a slippery floor? Explain.

Concept V : Friction is an opposing force on a moving body.

Tools of Evaluation: Short answer type, Multiple choice type, True/false type.

SA

- 1. Illustrate with the help of two examples from everyday life that friction opposes the motion of a moving body.
- 2. Write two examples where frictional force helps in our daily life.
- 3. Give two examples where force of friction is disadvantageous.

MCQs

- 4. Sewing machine is oiled to
 - A. increase the friction.
 - B. decreases the friction.
 - C. arrest the dust.
 - D. make it shiny.

5. Friction between ground and soles of shoe can be increased by
- rubbing the soles on floor.
 - oiling the ground.
 - providing spikes in the soles.
 - making metallic soles.
6. Indicate False/true against each of the following statements
- Friction is a force in the direction of motion.
 - Friction is due to contact between two bodies.
 - Friction is more on a rough surface than on a smooth surface.
 - Banana skin reduces friction between the foot and the floor.
 - Sand increases the friction between foot and the floor.
 - It is easier to write on an oily paper because friction is less.
 - Rusting increases friction between different parts of the machine.
 - Machine parts are lubricated to reduce the friction.
 - Grooves in the tyres reduce the friction between road and the tyres.
 - Wheel ball-bearings and roller-bearings are used in machines to reduce friction.

Concept VI: Machines make work easier and faster.

Tools of Evaluation: Short answer (SA) type, Matching type, Multiple choice (MCQ) type.

SA

1. Mention names of four machines that you use in your daily life. Write how each of these machines makes your work easier/faster.

VSA

2. Name two simple machines that help us to apply force in a desired direction.
3. Name two machines that multiply force.

Matching type

4. Match the machines given in column A with their applications in column B.

Column A

- Lever
- Cycle
- Pair of tongs
- Pulley

Column B

- Force at a convenient point.
- Force in a convenient direction.
- Multiplies force.
- Gain in speed.

5. Which of the following machines is used to change the direction of force?
- A. A knife
 - B. A screw
 - C. A pair of tongs
 - D. A pulley.

Concept VII : There are various types of simple machines e.g. lever, pulley, inclined plane and wheel. Some machines are complex such as a bicycle, a sewing machine, a tractor, etc.

Tools of Evaluation: Short answer type and Multiple choice type.

SA

1. Name four simple machines that you use in your daily life.
2. Name four complex machines that you see around you.

VSA

3. Draw levers of type I, type II and type III. Indicate the positions of load, effort and fulcrum in each of these three types of levers.

MCQs

4. Which of the following is a simple machine?
 - A. Sewing machine
 - B. Tractor
 - C. Inclined plane
 - D. Bicycle.
5. Which of the following is a compound machine?
 - A. Pulley
 - B. Wheel
 - C. Inclined plane
 - D. Bicycle.
6. A strong spoon used for opening the lid of a biscuit tin is
 - A. a lever of first type.
 - B. a lever of second type.
 - C. a lever of third type.
 - D. an inclined plane.

7. A spiral staircase with steps is
 - A. a lever.
 - B. a pulley.
 - C. an inclined plane.
 - D. a wheel.
8. In a third type of lever, at the middle position is
 - A. load.
 - B. effort.
 - C. fulcrum.
 - D. none of the above.
9. In the lever of second type, the load is placed at the
 - A. front position.
 - B. middle position.
 - C. back position.
 - D. any of the positions.
10. When we use our forearm to lift weight, the forearm is
 - A. a lever of first type.
 - B. a lever of second type.
 - C. a lever of third type.
 - D. an inclined plane.
11. Which of the following is a lever of type I?
 - A. Bottle opener
 - B. Fishing rod
 - C. A pair of tongs
 - D. A balance beam.
12. Which of the following is an inclined plane?
 - A. A knife.
 - B. Nut cracker
 - C. a wheel
 - D. A see-saw.

Concept VIII: Machines require proper care and maintenance.

Tools of Evaluation: VSA, SA, Fill in the blanks.

VSA

1. Name two machines that are oiled.

SA

2. Give two advantages of oiling a machine.
3. "You are advised to clean the machine and to keep it covered after use". Give two reasons to support the statement.

Fill in the blanks

4. Application of paint protects a machine from_____.
5. Maintenance and care increases the_____ and_____ of a machine.

The Living World

<i>S.No.</i>	<i>Concepts</i>	<i>Skills/Competencies</i>	<i>Specific tasks/Behaviours</i>	<i>Tools of Evaluation</i>
I.	There are variety of living organisms around us.	<p>Recognizes the living world around him.</p> <p>Infers on the basis of observations that living organisms vary in their food habits, preference of homes, habitats etc.</p> <p>Concludes that each one of the organisms possesses a definite shape, size, and structure.</p>	<p>Prepares list of some living organisms living in his surroundings</p> <p>Observes food habits of animals e.g. dogs, crows, cows, etc.</p> <p>classifies animals according to their food habits, habitats etc.</p> <p>Observes plant growth at different places: ponds, soil etc.</p> <p>Lists plants that grow in water and plants that grow in dry soil.</p> <p>Lists animals living in water and animals living on earth.</p> <p>Observes and records shapes, sizes and structures of some living organisms.</p> <p>Compares shapes and sizes of some of these living organisms and infers that each organism can be identified.</p> <p>Observes shapes of various plants in school campus, on road side, hills, villages etc.</p> <p>Matches shapes of plants with geometrical figures.</p> <p>Matches shapes of animals with geometrical figures.</p>	Multiple response questions, Very Short Answer type.
II	Living organisms have variety of shapes.	<p>Applies knowledge of geometrical figures to identify shapes of living organisms.</p> <p>Classifies animals and plants on the basis of geometrical shapes.</p>	<p>Matches shapes of various plants in school campus, on road side, hills, villages etc.</p> <p>Matches shapes of plants with geometrical figures.</p> <p>Matches shapes of animals with geometrical figures.</p>	Matching type, Fill in the blanks, VSA

1	2	3	4	5
			Groups plants and animals on the basis of their shapes:	
			Lists some plants and their sizes (by observing plants around home and school).	
			Performs simple experiments such as observing water from pond under microscope.	
			Draws figures of living organisms as seen under microscope.	
			Lists big and small animals.	
				VSA
III.	Living organisms have variety in size.	Observes that animals and plants around him have different sizes.		
		Recognizes that some animals and plants are so small that these cannot be seen with naked eye.		
		Observes these small organisms with the help of microscope.		
		Infers that living organisms have variety in size.		
IV.	Animals have different food habits and preferences.	Observes the food habits of animals and food analyses the scheme of evaluation that animals eat different kinds of foods.	Lists some common animals and their food preferences.	
		Plants prepare their own food.		
		Relates food habits of animals to their life styles.	Classifies animals on the basis of their food habits.	
		Recognizes that plants prepare their own food.	Explains how plants get their food.	
		Understands 'how plants prepare their food'.		
V.	Animals have various types of homes for shelter and protection.	Realizes the need of home by animals.	Enumerates the need of home by animals.	
		Observes the formation of nest by birds in his home and surrounding areas.	Describes the nest formation of common birds in his home.	
		Recalls the types of homes of animals in his surroundings.	Lists some common animals such as dog, cat, rabbit, hen, peacock etc. and describes their habits.	

Distinguishes between homes of the pets which we make for them and the homes which animals make for themselves.
Infers that various animals have different kinds of preferences for homes.

the kinds of homes they use for living.
Differentiates between the homes we make for pets e.g., parrot, dog and cat and the homes these animals make themselves when not living as pets.
Relates type of home to living styles of various animals.

VI. Animals have different types of habits such as active during day whereas some animals are active during day light whereas others come out of their homes in night.

Compares the characteristics to both the groups i.e. day and night coming animals.
Makes list of animals active during night and notes down the changes that help them to move freely in night.

Student's Record
VSA

Performs simple experiments to see the sensitivity of animals such as sparrow, mosquitoes, moth etc., towards light.

VII. Living organisms live in various habitats e.g. pond, forest, sea-shore.

Understands the term 'habitat'.
Recognizes that some living organisms have their homes in water.

Recalls the size, shape and weight of some of the animals living in water such as Blue whale, etc.

Observes that some plants also grow and live in water.

Relates habitats of animals to their food habits and other needs.

Locates houses of animals, birds, pets in his surrounding and identifies their habitats.

Explains the term 'habitat' with the help of examples.

VSA, MCQ,
Student record

Lists animals which live in water.

Lists animals which live in dry area.

Compares habits of animals which live in water with those living in dry areas.

Names plants that grow in dry area and some plants that grow in water.

Recalls names of trees in his surroundings and identifies their habitats.

Identifies plants and animals that have both water and earth as their habitat.

Lists animals living in his surrounding areas and classifies these according to habitats.

Enumerates trees in his surroundings and classifies these according to habitats.

Identifies special features of animals that have both water and earth as their habitat.

Labels special characteristics of plants that live both in water and dry areas.

Recalls species and scientific names of some common plants and animals.

Classifies plants and animals in to the species they belong to.

Interprets the scientific names of plants and animals.

Observes that all mango trees have similar body parts and their functions; all neem trees have similar body parts and functions.

Distinguishes between a group of mango trees and a group of neem trees.

Distinguishes between two mango trees with respect to size of trees, leaves, branching, etc.

Observes that all dogs are similar in that they have similar body parts and their functions.

Collects scientific names of animals from zoo and of plants from botanical gardens. Understands these scientific names.

MCQs,
Student
Record

VIII.

A group of similar individuals is known as species and each has name.

1	2	3	4	5
IX.	Living things grow and have a definite life span.	<p>Observes that the seeds under suitable conditions germinate and by continuous growth convert into a tree gradually.</p> <p>Identifies three stages of development in human beings.</p> <p>Infers that some living forms grow continuously for some period of their life and some during the whole period of their life cycle.</p> <p>Recognizes that living objects have a definite life span.</p> <p>Recalls life span of some common animals and plants.</p>	<p>Germinates seeds of pea/gram etc. and records the growth and development of the plant.</p> <p>Locate eggs of birds (hen/sparrow) and observes their hatching.</p> <p>Observes how puppies of pet dogs and young ones of birds grow.</p> <p>Prepares list of family members, relatives and friends and classifies them into different stages of growth such as infants, adolescents, adults, old age.</p> <p>Knows life spans of some common animals and plants.</p>	Student Record, VSA.
X.	All living organisms carry out certain processes which non-livings do not such as growth, movement, feeding, respiration, excretion, reproduction, and sensitivity.	<p>Observes life processes such as growth, respiration, reproduction, movement, excretion and sensitivity in plants and animals.</p> <p>Observes that non-living objects do not carry out these life processes.</p> <p>Distinguishes living from non-living.</p> <p>Infers on the basis of observations that all living organisms—plants and animals carry out life process of growth, movement, respiration, feeding, excretion, reproduction, and sensitivity.</p>	<p>Observes the process of growth in some common animals and plants in his surroundings and records his observations over a period of two months.</p> <p>Observes the process of respiration in man, fish, plants and records the changes when fish is taken out of water or when plant is placed in vacuum.</p>	Student record, VSA.

1	2	3	4	5
			Performs simple experiments to see the processes of movement and sensitivity in plants and animals.	
			Gives reasons for life phenomenon such as one banana tree multiplies into a number of trees whereas a dry wooden block does not multiply.	
			Observes slides of onion peel, and human cheek cells under microscope and draws diagrams of onion peel cells and human cheek cells on his note books.	
			Compares animal and plant cells	
			Names animals/plants made up of a single cell.	
			Lists multicellular living organisms.	
			Draws figures of unicellular organisms such as Amoeba, Paramecium, Bacteria, Algae etc.	
			Explains the mode of nutrition in plants and animals.	Students Record, VSA
			Performs simple experiments such as comparing the two plants—one placed in dark room and other near a window and records observations.	
XI.	All living organisms are made up of cells.	Understands that cell is the unit of body construction in living beings. Recognizes that cells are of different shapes and sizes. Observes and explains the structure of unicellular animals as seen under microscope. Compares the single celled animal and single cell of multicellular organism.		
XII.	Living organisms can be classified as plants and animals on the basis of certain characteristics.	Observes the mode of nutrition in plants and animals. Recognizes that animals move to reach food while plants do not. Recognizes that plants synthesize their own food in the presence of sunlight whereas animals do not.		

Observes and records how animals in his surroundings such as dogs, cats, birds etc. search their foods.

Distinguishes between plants and animals.

Lists animals having backbone.

Draws figures of some multicellular big animals and labels the backbone.

Draws figures of Amoeba Paramoecium, and shows the absence of backbone.

Distinguishes between vertebrates and invertebrates.

Classifies animals as vertebrates and invertebrates.

Tabulates differences among the plants of different varieties found in his surroundings.

Collects specimens of Fern, Algae, Fungi etc.

Collects specimens of flowers and flower bearing plants.

Compares the size, shape and other characteristics of herbs, shrubs and trees.

Prepares the list of seasonal flowering plants grown in the school lawns, plants used for school hedge and big trees in and around school campus. Classifies these plants as herbs, shrubs, trees etc.

XIII. Animals can be Recalls that animals without backbone are classified on the known as Invertebrates whereas animals having backbone are known as Vertebrates.

characteristic such as vertebral column. Infers on the basis of observations that backbone is the characteristic of multicellular animals and unicellular animals have no backbone.

XIV. Plants can be Recognizes different parts of a plant. classified into Infers that some plants bear flowers such groups on the as rose whereas others do not such as algae, basis of certain fungi.

characteristics Classifies flower bearing plants as a group. such as flowering Observes that non-flowering plants do not and non-flowering, herbs have distinct stem, leaves and other body parts. and shrubs.

Distinguishes between herbs, shrubs and trees.

Concept 1: There is a variety of living organisms around us.

Tools of Evaluation : VSA; Multiple response questions.

VSA

1. Name ten living organisms that you see around you.
2. Name two animals found in water.
3. Name two animals who eat only plants and two animals who eat smaller animals.
4. Name two plants that grow in ponds and two plants that grow in soil.
5. Classify following things as living or non-living.
a) Gram seed (b) Bacteria (c) Feathers of Peacock (d) Sparrow (e) Amoeba (f) Whale (g) Mushroom (h) Ant (i) Wood (j) Hen

MCQs

(More than one may be correct)—*Multiple Response*

6. Which of the following plants grow in water?
A. Algae
B. Fern
C. Neem
D. Rose
7. Which of the following animals are found both in water and on land ?
A. Fish
B. Frog
C. Snake
D. Lizard
8. Which of the following animals eat vegetable food only?
A. Elephant
B. Cow
C. Dog
D. Lizard
9. Which of the following animals live in caves?
A. Tiger
B. Leopard
C. Fox
D. Dog

10. Which of the following animals fly?

- A. Duck
- B. Owl
- C. Peacock
- D. Kangaroo.

Concept II: Living organisms have variety of shapes.

Tools of Evaluation : Matching type, Fill in the blanks, VSA

1. Write down the shapes of the following trees?

Tree

- a. Mango
- b. Deodar
- c. Peepal
- d. Tamarind
- e. Ashok Tree

Shape

2. Match the plants given in column A with the geometrical shapes given in column B.

Column A

- (i) Ashok
- (ii) Mushroom
- (iii) Marigold
- (iv) Neem
- (v) Coconut

Column B

- (a) Triangular
- (b) Semicircular
- (c) Rhombus
- (d) Circular
- (e) Cylindrical

4. Write names of two trees which are triangular in shape.

5. Classify following animals according to the shapes they have.

- (a) Cockroach
- (b) Louse
- (c) Snake
- (d) Earthworm
- (e) Lizard
- (f) Scorpion.

Concept III: Living organisms have variety in size.

Tools of Evaluation

MCQs

1. Arrange the following animals in ascending order of size.
(A) Deer
(B) Dog
(C) Elephant
(D) Rat
(E) Spider.
2. Arrange the following trees in ascending order of size.
(A) Neem
(B) Coconut
(C) Sunflower
(D) Paddy
(E) Algae.
3. Which of the following organisms can be seen with naked eye ?
A. Bacteria
B. Algae
C. Virus
D. Fern.
4. Which of the following living organisms *cannot* be seen with naked eye
A. Louse
B. Silkworm
C. Amoeba
D. Snail.
5. Water used for drinking purpose is boiled in order to
A. kill microscopic animals present in water.
B. remove dust
C. keep flies away
D. reduce the quantity of water.

VSA

6. Name the biggest animal.
7. Name two microscopic living organisms.

Concept IV: (A) Animals have different food habits and preferences.

(B) Plants prepare their own food.

Tools of Evaluation: VSA

1. Name five animals that eat smaller animals.
2. Name two birds that eat vegetable food only.
3. Group following animals according to their food habits.
 - (i) Cat
 - (ii) Dog
 - (iii) Lizard
 - (iv) Goat
 - (v) Cow
 - (vi) Elephant
 - (vii) Whale
 - (viii) Tiger
 - (ix) Snake
 - (x) Deer.

SA

4. How do plants get their food?

Concept V: Animals have various types of homes for shelter and protection.

Tools of Evaluation: Fill in the blanks, S.A.

1. In column A types of homes are given. Indicate in column B, the name of the animal against its home.

Column A

Column B

- (a) Soil home
- (b) Grass nest
- (c) Caves
- (d) Whole of tree
- (e) Web
- (f) Aquarium

2. In column A, some animals have been listed. Write the type of home used by each of these animals in column B.

Column A

- (a) Earthworm
- (b) Snake
- (c) Whale
- (d) Lion
- (e) Terminate
- (f) Pigeon

Column B

3. Write names of two pets and the type of home you would make for them.
4. Write names of two animals who do not like light and mention the type of home these animals have.

Concept VI: Animals have different types of habits such as some animals are active during day light whereas others come out of their homes in the night.

Tools of Evaluation: VSA, MCQs

1. Write names of three animals which are active during day time.
2. Write names of three animals which are active during night.

MCQs: (More than one response may be correct.)

3. Which of the following animals are attracted towards light?
 - A. Butterfly
 - B. Lizard
 - C. Moth
 - D. Ant.
4. Which of the following animals do not like light?
 - A. Earthworm
 - B. Beetle
 - C. Moth
 - D. Rat.
5. Which of the following animals move during night?
 - A. Sparrow
 - B. Owl
 - C. Mosquito
 - D. Termites.

6. Which of the following animals prefer day light?
- A. Earthworm
 - B. Mosquito
 - C. Butterfly
 - D. Housefly.

Concept VII: The living organisms live in various habitats such as pond, forest, sea-shore etc.

Tools of Evaluation: MCQ, SA.

1. Write habitat of each of the following plants.
 - (a) Hydrilla
 - (b) Cactus
 - (c) Neem
 - (d) Lotus
 - (e) Deodar.
2. Write habitat of each of the following animals.
 - (a) Frog
 - (b) Whale
 - (c) Cow
 - (d) Tiger
 - (e) Mosquito.
3. Which of the following plants grow in dry areas?
 - A. Lotus
 - B. Paddy
 - C. Cactus
 - D. Algae.
4. Which of the following animals live in water?
 - A. Rat
 - B. Eagle
 - C. Snail
 - D. Earthworm.
5. Which of the following plants grow in water?
 - A. Hydrilla
 - B. Sunflower
 - C. Rose
 - D. Wheat.

6. The biggest sea-animal in the world is _____.
- Hippopotamus.
 - Shark
 - Blue whale
 - Whale.

SA

7. Write names and main characteristics of three animals which live in water.
8. Explain the term 'habitat' with the help of two examples.

Concept VIII: A group of similar individuals is known as species and each species has a name.

Tools of Evaluation: MCQ, Fill in the Blanks.

- Identify the group name in each of the scientific names given below.
 - Panthera tigris*
 - Pavo cristatus*
 - Homo sapiens*
 - Mangifera indica*.
- Fill in the blanks.
 - The scientific name of China rose is _____.
 - Animals belonging to the same species have similarity of _____ and _____.
 - In the scientific name of a species the _____ is written first and _____ is the second word.
 - Homo sapiens* is the scientific name of _____.
 - Indian tiger and cat belong to the _____ species.

Concept IX: Living things grow and have a definite life span.

Tools of Evaluation: Students record, VSA.

- Student record:** Students may be asked to perform simple experiments such as germinating seeds of peas and recording the growth of seedling over a period of time. Similarly, the pupil may record growth of sparrow, chicken etc., from the stage of hatching from eggs.
The student record may be evaluated for student's observational skill, interest in plant/animal life.
- Write life-span of each of the following animals.
 - Man

- (B) Dog
- (C) House fly
- (D) Spider
- (E) Squirrel

3. Write the life span of each of the following plants.

- (A) Wheat
- (B) Paddy
- (C) Eucalyptus tree
- (D) Ashok tree.

Concept X : All living organisms carry out certain processes which non-living do not, such as growth, movement, feeding, respiration, excretion, reproduction and sensibility.

Tools of Evaluation : Student record, SA., MCQs.

1. **Student record:** Students may be asked to observe and record their observations on life processes in plants and animals separately. Such as

(A) Sow seeds of Pea and observe the growth of seedling over a period of two months. Record size, shape and colour and draw graph of growth.

(B) Locate eggs of birds and observe hatching and growth of youngones. Similarly observes the processes of feeding, movement, respiration, reproduction, excretion and sensivity in both plants and animals in his everyday experience and records his observations.

(C) Also observes the absence of these life processes in non-living objects. This students record should be evaluated for his interest in living world and understanding of life processes.

MCQ

2. Which of the following is *not* a living-object?

- A. Bacteria
- B. Wood
- C. Tree
- D. Fungus.

3. Which of the following is a living object?

- A. Seed
- B. Soil
- C. Water
- D. Fertilizer.

4. Which of the following objects share characteristics of living and non-living?
- Bacteria
 - Amoeba
 - Virus
 - Euglena.

SA

5. Explain the following phenomenon.
- A banana tree multiplies into a number of trees whereas a dry wooden block does not.
 - Fish dies when taken out of water.
 - An uprooted tree does not grow.
6. Suggest an experiment to show the process of respiration in plants.
7. Suggest an experiment to show that plants are sensitive to external stimuli.
8. State five life processes that distinguish between living and non-living.

Concept XI: All living organisms are made up of cells.

Tools of Evaluation: SA, MCQs

- Draw the structure of cells of the onion peel as seen under microscope.
- Draw the structure of cells of the human cheek as seen under microscope.
- A new born baby's body consists of
 - 12,000 cells.
 - 2,000 cells.
 - 2,000 million cells.
 - 2,000 billion cells.
- Which of the following living organism is *not* made up of a single cell?
 - Amoeba
 - Paramoecium
 - Bacteria
 - Hydra.
- Which of the following is *not* made up of cells?
 - Wood
 - Fungi
 - Sugar crystal
 - Bacteria.

Concept XII: Living organisms can be divided into two groups, namely, plants and animals on the basis of certain characteristics.

Tools of Evaluation

1. Animals and plants differ in their mode of
 - A. nutrition.
 - B. reproduction.
 - C. respiration.
 - D. growth.
2. Plants prepare their food in the presence of
 - A. CO_2 water and sunlight.
 - B. O_2 , water and sunlight.
 - C. O_2 , CC_2 and water.
 - D. Air, water and fertilizer.
3. Which of the following living organisms cannot prepare its own food?
 - A. Fish
 - B. Hydra
 - C. Algae
 - D. Mango tree.
4. Which of the following living organisms move in search of food?
 - A. Fern
 - B. Volvox
 - C. *Mimosa pudica* (touch me not)
 - D. Lizard.
5. List two characteristics that distinguish between plants and animals.

Concept XIII: Animals can be classified as vertebrates or invertebrates.

Tools of Evaluation: MCQs, Fill in the blanks and S.A.

1. Which of the following animals does *not* have backbone?
 - A. Frog
 - B. Earthworm
 - C. Fish
 - D. Snake.
2. Which of the following animals belongs to vertebrate category?
 - A. Earthworm
 - B. Cockroach
 - C. Bird
 - D. Insects.

3. Which of the following belongs to invertebrate group?

- A. Star fish
- B. Dog-fish
- C. Rohu fish
- D. Snakes.

Fill in the blanks

4. The animals having backbones are called _____.

5. The largest vertebrate on the land is _____.

6. Besides backbone or bony skeleton, animals can also be classified according to their body _____.

7. Some animals have hair, whereas all the birds have _____.

8. Write in 20 words, on what basis the animal kingdom has been classified in two categories: vertebrates and invertebrates.

9. Give 5 examples each belonging to vertebrates and invertebrates.

10. Draw the outlines of 5 animals having backbone which you see around and indicate the position of backbone in them.

11. Group the animals on the basis of body covering.

Concept XIV: Plants can be classified into groups on the basis of certain characteristics such as herbs, shrubs, trees, flowering and non-flowering.

Tools of Evaluation : MCQs, SA.

1. Which of the following plants does *not* have distinct root, stem, leaves and flowers?

- A. Mushroom
- B. China rose
- C. Lotus
- D. Mango.

2. Which of the following is a flowering plant?

- A. Algae
- B. Mushroom
- C. Fern
- D. Tulsi.

3. A non-flowering plant does *not* have distinct
 - A. flowers.
 - B. stem.
 - C. leaves.
 - D. all the above.
 4. Which of the following is a non-flowering plant?
 - A. Algae
 - B. Cactus
 - C. Potato
 - D. Neem.
 5. A plant, 9 ft. tall with hard and woody stem is called a
 - A. shrub.
 - B. herb.
 - C. tree
 - D. fern.
- SA
6. Draw the diagram of a typical flowering plant and label its parts.
 7. Write two examples each of flowering and non-flowering plants.
 8. Write two examples each of herbs, shrubs, and trees.

Unit VIII

Structure and Functions of Living Body

S.No.	Concepts	Skills/Competencies	Specific tasks/behaviour	Tools of Evaluation
I.	Plants have aerial and underground parts	<p>Observes that root, stem and leaf are parts of a plant.</p> <p>Recognises that roots are underground (they fix the plant), leaves and stem are above the ground.</p>	<p>Pulls out a small, potted bean plant and observes:</p> <p>The underground parts (roots) fix the plant,</p> <p>The aerial portion (shoot) is made of flat, green leaves and cylindrical stem, the stem connects the roots to the leaves, the stem and roots are branched.</p> <p>Lists parts of a plant.</p> <p>Describes these parts.</p>	MCQ, VSA, SA
II.	Plants have two types of root systems	<p>Observes that roots in plants are of two types: tap and fibrous.</p> <p>Compares tap and fibrous roots.</p>	<p>Observes the museum specimens of a maize root and bean root.</p> <p>Observes that:</p> <p>bean root has a main tap root and its branches.</p> <p>Maize roots are many, similar and fibre like.</p> <p>Distinguishes between two types of roots.</p> <p>Cites examples of the two types of roots.</p>	VSA, SA, MCQ

1	2	3	4	5
III.	<p>Roots normally perform the functions of absorption by fixing the plant. Roots are modified to store the food material and mechanical support to branches of stem.</p>	<p>Understands that roots are modified for food storage and mechanical support.</p> <p>Recognises that roots absorb water and mineral salts from the soil.</p> <p>Understands the role of root-system in soil binding.</p> <p>Draws the diagram of roots.</p> <p>Compares the two types of roots in maize.</p>	<p>Draws diagrams of these types. Labels the diagrams.</p> <p>Observes:</p> <p>Swollen roots of carrot, beet, turnip and sweet potato in the kitchen,</p> <p>Supporting roots of Banyan tree.</p> <p>That the potted plants will wither and die later if these are not watered.</p> <p>Explains why soil is not washed away from dense forest areas,</p> <p>Draws the fibrous roots in maize.</p> <p>Differentiates between the tap and fibrous roots.</p>	<p>VSA, SA, MCQ</p>
IV	<p>Shoot system is made up of stem and leaves.</p>	<p>Recognises that the shoot system consists of the main stem, branches and leaves. Stems are covered with bark.</p> <p>The stem has nodes and internodes.</p>	<p>Observes parts of the plant growing above ground.</p> <p>Observes the surface of different plant shoots.</p> <p>Identifies the nodes and internodes on the stem.</p>	<p>SA, MCQ</p>
V.	<p>Stem conducts sap from root to leaves.</p>	<p>Concludes that the stem furnishes a path of conduction from root to stem, leaves, flowers and fruits.</p> <p>Performs the experiments (skill) to show the conductional sap.</p>	<p>Draws the diagram and labels it.</p> <p>Puts a shoot of Balsam or <i>Vinca</i> in coloured water.</p> <p>Observes the path of coloured water.</p> <p>Notes and lists the portions that become coloured.</p>	<p>SA, MCQ</p>

1	2	3	4	5
VI.	Stem modified for storage or food manufacture. It has scale leaves on nodes.	Stem gets food has nodes and internodes and bears leaves. It remains underground for storage of food. Stem becomes green and flat for food manufacture but bears leaves (spines) on nodes.	Observes the modified stems of potato, ginger and onion. Notes that these are underground. Observes the presence of scale leaves, nodes and internodes. Enumerates the functions of these underground stems. Draws the diagrams and labels these. Observes Cactus stem and notes that it is fleshy and green. Identifies nodes, internodes and leaves in the form of spines. Enumerates the functions of stem. Draws the diagram and labels parts of the stem.	MCQ, SA Student record
VII.	Stem modified mechanical support (Climbers)	gets Observes the additional structure i.e. for tendrils. Infers that these are stem modifications for weak plants. Draws and labels the sketch (skill) of tendrils.	Observes additional structures present on passion flower, gourd or grapevine shoot. Observes that these structures are wiry and clasp around objects. Enumerates the functions of tendrils. Collects plants with tendrils. Draws the diagram of climber. Lists some plants with stem tendrils.	

1	2	3	4	5
VIII.	Leaves are green flat portions of shoot. Leaf base, stalk, leaf blade and veins are the main parts of a leaf.	Recognises that leaves are flat, green parts of shoot. These are of different shapes. Recognises the parts of leaves—leaf base, stalk, leaf-blade and veins. Draws and labels the sketches of leaves.	Observes the flat and green structures borne on the nodes. Observes the leaves of the plants (Mango, Neem, Sadabahar etc.) Collects and presses the leaves of five different plants. Makes the impression of leaves on paper. Studies different parts of a leaf. Draws the diagram and labels parts of a leaf.	Student Record, SA
IX.	Leaves perform the function of photosynthesis, manufacture of food i.e. sunlight, air and water are necessary for the photosynthesis.	Recognises that chlorophyll, sunlight, air and water are necessary for the manufacture of food i.e. photosynthesis.	Observes the colour of leaves. Observes that greenness is due to the presence of chlorophyll pigment. Lists the requirements to manufacture food by leaves. Explains the process of photosynthesis. Lists plants that have leaves of red, yellow, brown colours (other than green). Lists plants with partially green leaves.	MCQ, VSA, SA

1	2	3	4	5
X.	Leaves are modified as tendrils for support, spines for protection of support, reduction in loss of water.	Recognises that leaves can be modified as tendrils for support, spines for protection and reduction in loss of water. Draws and labels the sketches of spines.	Observes Pea plant and notes the tendrils which is a modified leaf. Enumerates the functions of a tendril. Observes spines in Cactus and their position. Enumerates the functions of spine. Draws the diagram of Cactus leaf and labels it.	MCQ, SA, VSA
XI(a)	Flowers are of different colours, shapes and sizes but are identical in structure.	Recognises that all plants do not bear flowers and flowers may be of various shapes, sizes, smell and colours (some flowers do not have any smell).	Visits a garden during spring season and observes that flowers are of different colours, sizes and shapes; flowers have different smell (some flowers do not have any smell) some plants do not bear flower. Collects and preserves various types of flowers. Lists various types of flowers.	Student Record, MCQ, SA

5

4

3

2

1

XI(b)	Flowers have four whorls : sepals, petals, stamens and carpels; (anthers) which are filled with powdery mass (pollens); carpels have swollen structure at the base (Ovary) which is filled with ovules. Draws and labels the diagram of parts of flower.	Observes and recognises that flower has four whorls—sepals, petals, stamens and carpels; stamens are swollen at the tips (anthers) which are filled with powdery mass (pollens); carpels have swollen structure at the base (Ovary) which is filled with ovules. Draws and labels the diagram of parts of flower.	Brings a mustard flower to the class room and observes green leaf like parts (Sepals), coloured parts (Petals) Removes these parts and observes stalks with swollen tips that are filled with powdery mass; in the centre, flask-shaped (Carpels) that have a swollen base (Ovary) Dissects the ovary and observes many small rounded structures (ovules) inside it. Separates sepal, petal, stamen and draws sketches, labels the parts of stamen. Removes all sepals, petals, stamens and draws sketch of the carpel; labels the parts of carpel.	student Record, MCQ.	
XII.	Flowers after pollination form fruits and seeds.	Recognizes that pollens are transferred to the carpel. Understands that ovules of flowers turn into seeds and the ovary into fruits. Draws and labels the diagram of ovary, seeds and fruits.	Observes the visit of an insect on sunflower head. Observes flowers changing in to tomatoes in a kitchen garden. Observes seeds being borne when tomato fruits are cut open for eating. Lists various fruits eaten and collects seeds from them. Draws an apple that has been cut in two halves length and widthwise—labels the seeds.	MCQ, VSA, SA, Student Record.	

1	2	3	4	5
XIII.	The food eaten by animals is digested in the digestive system, consisting of mouth, oesophagus, stomach, small intestine, large intestine, anus, liver, gall bladder and pancreas.	<p>Recalls various organs of digestive system.</p> <p>Recognizes functions of various organs of digestive system.</p> <p>Illustrates the process of digestion.</p> <p>Applies the knowledge of digestive system to maintain proper functioning of his stomach, small intestine, large intestine, anus, liver, gall bladder and pancreas.</p>	<p>Observes various parts of digestive system in a model or chart.</p> <p>Draws various parts of the digestive system.</p> <p>Distinguishes between four types of teeth.</p> <p>States functions of each type of teeth and tongue.</p> <p>Enumerates functions of oesophagus, stomach, small intestine and large intestine.</p> <p>Lists steps/precautions needed to maintain proper functioning of teeth, tongue and other organs of digestive system.</p>	MCQ, VSA, SA.
XIV.	Respiratory system is made up of nose, trachea, bronchi, and lungs.	<p>Recalls various organs of the respiratory system</p> <p>Illustrates the process of respiration with the help of experiments/diagrams.</p> <p>Infers on the basis of observations that we exhale carbon dioxide and inhale air rich in oxygen.</p> <p>Recognizes functions of lungs, trachea, bronchi, and nostrils.</p>	<p>Lists various organs of respiration.</p> <p>Enumerates functions of organs of respiration.</p> <p>Prepares models to show the functioning of lungs.</p> <p>Performs simple experiments and observes the nature of gas inhaled and exhaled such as gas exhaled turns lime water milky etc.</p> <p>Observes the functions of nose.</p>	Student Record, MCQs

1	2	3	4	5
XV.	The circulatory system supplies blood to all the organs of the body. The heart and blood vessels are main organs of the circulatory system.	Recalls the organs of circulatory system. Understands the functions of heart and blood vessels.	Observes working of heart through models. Prepares charts, models of circulatory system. Enumerates functions of heart. Lists the types of blood vessels. States functions of each type of vessel. Performs simple experiments such as noting down the heart beat at different times such as before and after running; notes down the pulse rate.	MCQ, VSA, SA.
XVI.	The nervous system consists of brain, spinal cord and the nerves. These organs help in coordinating all the functions of the body.	Recognizes that we respond to the environmental changes. Recalls the functions of sense organs. Understands the functioning of brain as decision maker and in sending commands to different parts of the body. Understands how nerves carry message of sense organs to brain or spinal cord. Understands the structure and location of brain.	Relates heart beat and pulse rate to circulation of blood in the body. Observes that we respond to external stimuli of touch, taste, smell, light, sound etc. Compares telephone cable system with the nervous system. Explains the functions of brain, spinal cord and nerves. States the types of nerves and the functions of each type of nerve. Illustrates the role of nervous system in responding to environmental changes. Draws and labels different parts of nervous system.	SA, VSA MCQ.
			Relates functioning of sense organs to the functioning of nervous system	

1	2	3	4	5
XVII.	The urinary system collects the liquid wastes and helps the body get rid of them. It is made up of two kidneys, two ureters, the bladder and the urethra.	Recalls the organs of urinary system. Understands the structure of urinary system. Comprehends the functions of kidneys, ureters, the bladder and urethra.	Lists various organs of urinary system. Draws and labels diagram of urinary system. Enumerates functions of kidneys, ureters, bladder and urethra.	SA, VSA, MCQ
XVIII.	Reproduction is the process of producing individuals of one's own kind.	Infers that animals (including human beings) produce individual's of one's own kind. Recalls the process of reproduction.	Observes that animals like pig, cat, crow, cow, hen etc. produce their young ones. Explains the process of reproduction in hen and cat.	VSA, SA.
XIX.	The muscular system helps in movement and locomotion.	Understands functions of muscular system.	Explains how muscular system helps in day-to-day activities. Explains the role of muscular system in functioning of internal organs like heart, lungs and digestive system etc. Observes that sweat is produced after exercise.	SA, VSA
XX.	The skin helps in protection of the body.	Recalls functions of skin. Understands that skin has sense organs and sweat glands.	Observes that we can feel the hotness/coldness of an object by touching it. Illustrates that skin acts both as a sense organ and as an excretory organ.	VSA, SA.

1	2	3	4	5
XXI.	The skeleton protects the inner backbone, limb bones and ribs. body parts and gives shape to the body.	Recognizes that skeleton consists of skull, backbone, limb bones and ribs. Comprehends functions of the skeletal system.	Examines the skeleton of man and some other animals kept in the museum. Identifies different parts of the skeleton. Enumerates functions of the skeletal system.	VSA,
XXII.	Animals use different organs for locomotion.	Recalls different organs used by different animals for locomotion. Understands the role of locomotion in animal life.	Observes different kinds of animals moving. Names different organs used by different animals for locomotion. Explains the role of locomotion in animal life.	MCQ, VSA, SA
XXI-II.	All parts of the body are essential for proper functioning.	Realizes that each part of the body performs a specific function and loss of a part affects functioning.	Performs simple experiments and records his observations such as growing a plant without roots, working with eyes closed. Observes in day-to-day life that people without eyes cannot see, people without legs cannot walk and other types of handicapped people.	MCQ, SA

Concept I: Plants have aerial and underground parts.

Tools of Evaluation: MCQ, VSA, SA.

1. The underground part of the plant is known as
 - A. leaf.
 - B. root.
 - C. stem.
 - D. shoot.
2. The aerial portion of a plant is made of
 - A. leaf alone.
 - B. roots alone.
 - C. stem alone.
 - D. leaf and stem.
3. In the plants
 - A. leaves are branched.
 - B. stem is branched but roots are not branched.
 - C. stem is not branched but roots are branched.
 - D. stem is branched and roots are branched.
4. List the various plant parts.
5. State the functions of a root.
6. State the functions of stem.
7. State the functions of leaves.

Concept II : Plants have two types of root systems.

Tools of Evaluation : MCQ, VSA, SA.

1. The main difference between a tap and a fibrous root is in
 - (i) number of branches.
 - (ii) number of main roots.
 - (iii) presence of main roots.
 - (iv) presence of branches.
2. In fibrous roots the branches are
 - A. absent.
 - B. similar.

- C. fibre like.
D. many and similar.
3. In tap roots the number of main root(s) is
A. 1
B. 2
C. 3
D. 4.
4. Write two examples of tap and fibrous roots each.
5. Draw the labelled diagram of
(a) fibrous roots of maize.
(b) tap roots of beet.

Concept III : Roots normally perform the functions of absorption and fixing the plant. They are modified to store the food material and also for mechanical support to aerial branches of stem.

Tools of Evaluation : VSA, SA, MCQ

1. Fibrous roots of maize
A. support the plant and absorb water.
B. store food.
C. store food and support the plant.
D. absorb water and store the food.
2. During heavy rains the soil from dense forest areas is not washed away because
A. rain water does not fall upon it directly.
B. the branches of roots bind the soil particles.
C. leaves of trees absorb the water.
D. the soil is covered by fallen leaves of trees.
3. Why do the tap roots of turnip get swollen? Explain.
4. Why do the aerial roots in banyan borne on branches get fixed in soil?
5. The school was closed for three days and the chowkidar fell ill. When Amit came to school he found that almost all potted plants were dead. What was the reason for this in your opinion?
6. Draw labelled sketches of :
(i) tap root of carrot.
(ii) roots of sweet potato.

Concept IV : Shoot system is made up of stem and leaves.

Tools of Evaluation: MCQ, SA.

- Node and internodes are present on
 - root.
 - stem.
 - leaf.
 - fruit.

Fill in the blanks

- _____ of a plant is the link between _____ and _____ and _____.
- Name different parts of the shoot system.
- Enumerate the functions of bark.
- Explain the terms nodes and internode.
- Draw labelled diagram of a shoot.

Concept V : Stem conducts sap from root to leaves.

Tools of Evaluation

- The parts of plant that become coloured when dipped in coloured water are
 - entire stem.
 - entire leaf.
 - veins of leaves.
 - stalk of leaves.
- Answer following questions related to an experiment showing conduction of sap from root to leaves.
 - Name two stains by which you can colour the water.
 - Why do you take coloured water in the experiment?
 - Which portions of the branch become coloured?

Concept VI : Stem gets modified for food storage or food manufacture and has scale leaves on nodes.

Tools of Evaluation : MCQ, SA

- Potato and Ginger are mainly
 - roots.

- B. leaves.
- C. branches.
- D. modified stems.

2. A bulb of onion has

- A. roots.
- B. stem.
- C. leaves.
- D. all the above.

Fill in the blanks

- 3. The _____ stems, store _____ for long periods.
1 2
- 4. In cactus the leaves are in the form of _____.
- 5. Define an underground stem.
- 6. Name three modified underground stems from everyday experience.
- 7. Mention two differences between raddish and potato.
- 8. Why ginger is regarded as modified underground stem?
- 9. Cactus is green, flat structure but it is not a leaf. Give two reasons.
- 10. Draw labelled diagrams of Ginger, Onion and Cactus.

Concept VII : Stem gets modified for mechanical support (climbers).

Tools of Evaluation : Student record, MCQ, SA

- 1. A tendril of a cucurbit is a stem because
 - A. it is borne at a node.
 - B. it is in avil of a leaf.
 - C. it is branched.
 - D. all the above.
- 2. Tendrils born by a plant help in
 - A. preparing the food
 - B. supporting the plant.
 - C. absorbing water.
 - D. bearing leaves.

3. List two tendril bearing plants—one of stem tendril and one leaf tendril.
4. Enumerate the functions of tendril.
5. Draw labelled diagram of tendril of the passion plant.

Student Record

6. Collect plants that bear tendrils.

Concept VIII : Leaves are flat portions of shoot. Leaf base, stalk, leaf blade and veins are the main parts of a leaf.

Tools of Evaluation: Student record, S.A

Student record

1. Preserves leaves of at least five plants.
2. Name the parts of a leaf.
3. Draw a labelled diagram of a leaf.
4. Observe the leaves of your garden and collect the leaves which are partly green.

Concept IX : Leaves perform the function of photosynthesis.

Tools of Evaluation : MCQ, VSA, SA

1. To make food, green leaves need :
 - A. air, water and darkness.
 - B. high temperature, organic manure and diffused light.
 - C. sunlight, air and water.
 - D. darkness, low temperature and air.
2. Name the green pigment present in leaf.
3. Explain the process of photosynthesis.

Student Record

4. Observe the leaves of your garden and collect the leaves which are partly green.

Concept X : Leaves are modified as tendrils or spines for support, protection, and reduction in loss of water.

Tools of Evaluation: S.A., Fill in the blanks.

- Student record (collection of modified leaves).
- Which of the following plants have leaves modified as spines?
 - Pea
 - Mango
 - Cactus
 - Vinca.
- Which of the following plants have modified as tendrils.
 - Sweet Pea
 - Cactus
 - Rose
 - Tomato.
- You are taken to a garden during spring and asked to observe the flowers. Fill in the following blanks after this observation.
 - Flowers are of _____ colours.
 - Flowers are of different _____.
 - Flowers are of _____ sizes.
 - Some flowers are with _____.
 - Flowers are _____ also.
 - Flowers are _____ borne on all _____.
- Prepare a list of flowers of yellow, red, blue, mixed and other colours.
- Prepare a list of large and small flowers.
- Prepare a list of flowers with scent. Note their colours also.
- Prepare a list of flowers without any smell. Note their colours also.
- Draw labelled diagram of pea plant.

Concept XI : Flowers are of different colours, shapes and sizes but are identical in structure. Flowers have four whorls: sepals, petals, stamens and carpels. These produce pollens and ovules.

Tools of Evaluation: Student record, SA, MCQ.

- Green leaf like parts of a flower are known as
 - Carpels.
 - Petals.

- C. Sepals.
- D. Stamens.

2. Coloured flat parts of a flower are known as
 - A. carpels.
 - B. petals.
 - C. sepals.
 - D. stamens.
3. Parts of a flower which resemble a stalk with swollen tips are known as
 - A. carpels.
 - B. petals.
 - C. sepals.
 - D. stamen.
4. Flask shaped organs (with swollen base) borne in the centre of flower are known as
 - A. carpels.
 - B. petals.
 - C. sepals.
 - D. stamens.
5. Powdery masses in the flower are produced at the tips of
 - A. carpels.
 - B. petals.
 - C. sepals.
 - D. stamens.
6. Many small structures are borne inside the basal, swollen portion of
 - A. carpels.
 - B. petals.
 - C. sepals.
 - D. stamens.
7. Basal swollen portion of carpel is called as
 - A. anther.
 - B. ovary
 - C. pollen carpel
 - D. ovules.
8. Structures that are produced in the ovary and later into seeds are known as
 - A. anther.
 - B. carpel.
 - C. pollen.

D. ovules.

9. In a flower following parts are observed :

- A. carpels
- B. petals
- C. sepals
- D. stamens.

Their correct sequence as we proceed from *below upward* is

- A. I, II, III, IV.
- B. II, III, IV, I.
- C. III, II, IV, I.
- D. IV, III, II, I.

10. Which of the following statements is correct ?

- A. Stamens and carpels are swollen at tips.
- B. Stamens and carpels are swollen at base.
- C. Stamens are swollen at tips and carpels at base.
- D. Stamens are swollen at base and carpels at tips.

11. Draw various parts of a flower, label these.

12. List functions of various parts of a flower.

Concept XII : Flowers after pollination form fruits and seeds.

Tools of Evaluation : MCQ, VSA, SA, Student Record.

1. An insect when visits different flowers carries

- A. ovules.
- B. pollen.
- C. smell.
- D. petal.

2. A tomato fruit is borne where a flower was borne; it has developed from the

- A. whole flower.
- B. stamens.
- C. carpel.
- D. ovary.

3. The formation of seed requires

- A. petals and pollen.
- B. sepals and petals.

- C. pollen and ovules.
- D. sepals and pollen.

4. Draw the two halves of an apple that has been cut
 - (a) in length
 - (b) in width
 - (c) label the seeds.
5. List four fruits.
6. Count the number of seeds in an orange fruit.
7. Draw diagram of gram seed, dry and germinated both and label the baby plant.

Concept XIII : The food eaten by animals is digested in the digestive system, consisting of mouth, oesophagus, stomach, small intestine, large intestine, anus, liver, gall bladder and pancreas.

Tools of Evaluation: MCQ, VSA, SA.

MCQs:

1. Which of the following organs is not a part of the digestive system?
 - A. mouth
 - B. liver
 - C. kidney
 - D. gall bladder.
2. Digestion of food starts in
 - A. stomach.
 - B. small intestine.
 - C. large intestine.
 - D. mouth.
3. The digested food is absorbed in
 - A. small intestine.
 - B. large intestine.
 - C. stomach.
 - D. liver.
4. Molars are used for
 - A. biting the food.
 - B. cutting the food.
 - C. grinding the food.

D. swallowing the food.

5. Saline is secreted in
- pancreas.
 - mouth.
 - liver.
 - small intestine.

VSA

6. Write the following organs of digestive system in the correct order as the processes of digestion starts step by step.
- Small intestine
 - Stomach
 - Oesophagus
 - Mouth
 - Anus
 - Large intestine.

SA

- Explain how pancreas help in digestion.
- Enumerate two functions of large intestine.
- Explain the role of liver in digestive system.
- Draw labelled diagram of digestive system.

Concept XIV : Respiratory system is made up of nose, trachea, bronchi and lungs.

Tools of Evaluation : Student's record: VSA, MCQ.

- Student record:** Student's may be asked to prepare models or suggest simple experiments to show the functioning and structure of lungs. These may be evaluated for his understanding of the process of respiration, skill and interest.

MCQs

- It is advised to breath through nose always instead of month in order to
- avoid mixing of food and air.
 - get warm and clean air.
 - keep mouth close for bad smell.

D. avoid drying up of saliva.

3. Hair present in the nose free air from

- A. dust particles.
- B. carbondioxide.
- C. oxygen.
- D. germs.

4. We breath in and breath out at a time through

- A. one nostril.
- B. both the nostrils.
- C. nose and mouth both.
- D. mouth.

5. When fresh air is inhaled it contains

- A. more of oxygen and less of carbondioxide.
- B. more of carbondioxide and less of oxygen.
- C. only oxygen.
- D. only carbon dioxide.

6. Which of the following gases passes into blood from the lungs?

- A. Oxygen
- B. Carbon dioxide
- C. Nitrogen
- D. Hydrogen.

7. Smoking is bad for health because

- A. smoke contains carbondioxide.
- B. smoke is inhaled through mouth.
- C. smoke warms the air inhaled.
- D. it causes suffocation.

SA

8. Suggest an experiment to show the working of diaphragm.

9. Draw a labelled diagram of respiratory system.

10. Explain the harmful effects of breathing in polluted air.

Concept XV : The circulatory system supplies blood to all the organs of the body. The heart and blood vessels are main organs of the circulatory system.

Tools of Evaluation : MCQ, VSA, SA

MCQs

- The circulation of blood in the body is controlled by
 - kidneys.
 - heart.
 - liver.
 - brain.
- The heart is located in the region of
 - abdomen.
 - neck.
 - chest.
 - stomach.
- Supply of blood to all the organs is necessary because it
 - transports oxygen and food material.
 - increases the quantity of blood in body.
 - reduces heart pressure.
 - transports carbon dioxide and other body wastes.
- Pure blood is carried from heart to different parts of the body by
 - arteries.
 - veins.
 - capillaries.
 - nerves.

Concept XVI : The nervous system consists of brain, spinal chord and the nerves. These organs help in co-ordinating all the functions of the body.

Tools of evaluation : MCQ, VSA, SA

MCQs

- Eyes are sensitive to
 - light.
 - sound.
 - touch.
 - temperature.

2. Which of the following animals does not have ears?
 - A. Sparrow
 - B. Fish
 - C. Owl
 - D. Snake.
3. The ear has double function of
 - A. hearing and smelling.
 - B. equilibrium and vision.
 - C. hearing and equilibrium.
 - D. hearing and touch.
4. Which of the senses are reduced when the nose is blocked due to bad cold?
 - A. Smell
 - B. Taste
 - C. Hearing
 - D. All of the above.
5. When the tip of a pencil is moved gently over the skin, you feel the
 - A. touch.
 - B. pain.
 - C. pressure.
 - D. sound.
6. Which of the following systems co-ordinates functions of the body?
 - A. Digestive
 - B. Respiratory
 - C. Muscular
 - D. Nervous.
7. In man, the skull encloses
 - A. liver.
 - B. brain
 - C. heart.
 - D. kidneys.
8. Sensations perceived by the sense organs are carried directly to
 - A. different parts of the body.
 - B. spinal chord.
 - C. brain.
 - D. muscles.

9. Sensations are carried first to the brain and then from the brain to different parts of the body by nerves in
- back bone.
 - abdomen.
 - forelimb.
 - hindlimb.

VSA

10. How would you distinguish between a big and a small pencil with your eyes closed?

SA

11. Explain the function of nervous system in responding to external stimuli.
12. Diagrammatically show the position of brain, spinal chord; and nerves in human body.
13. Compare the human nervous system with the telephone cable system.
14. How a snake reacts to the music of snake charmer?

Concept XVII : The urinary system collects the liquid waste and helps the body get rid of them. It is made up of two kidneys, two ureters, the bladder and the urethra.

Tools of Evaluation: MCQs, SA.**MCQs**

1. In which of the following organs urine is stored?
- Gall bladder
 - Urinary bladder
 - Stomach
 - Kidney.
2. Urine passes from kidneys to urinary bladder through
- ureters.
 - urethra.
 - anus.
 - stomach.
3. Liquid wastes are filtered from blood by
- ureters.
 - kidneys.
 - urinary bladder.
 - urethra.

4. The number of kidneys in man are
 - a) one.
 - b) two.
 - c) three.
 - d) four.
5. Urine passes out from the body through the
 - a) urethra.
 - b) anus.
 - c) nose.
 - d) skin pores.
6. Kidneys filter from blood
 - a) water.
 - b) red blood corpuscles.
 - c) white blood corpuscles.
 - d) liquid wastes.
7. Which of the following is correct if the kidneys fail to function?
 - a) Urine is not formed.
 - b) Urine is not excreted from body.
 - c) Liquid wastes are not filtered from blood.
 - d) Urine is not stored in the Urinary bladder.
8. Explain the function of urinary system in human body.
9. Draw a labelled diagram of urinary system.

Concept XVIII: Reproduction is the process of producing of individuals of one's own kind.

Tools of Evaluation: SA. Fill in the Blanks.

1. Give three examples where you can see hatching of young one's from eggs.
2. Define the process of reproduction.
3. What will happen if there is no reproduction in the living beings?
4. Fill in the blanks.
 - a) All living beings are capable of _____.
 - b) Human beings produce _____.
 - c) Animals have special _____ and _____ systems for reproduction.

Concept XIX: The muscular system helps in movement and locomotion.

Tools of Evaluation: SA.

1. State the functions of muscular system.
2. Explain how muscular system helps in the proper functioning of heart and lungs.

Concept XX: The skin helps in protection of the body.

Tools of Evaluation: VSA, SA.

1. State the functions of skin.
2. Illustrate with the help of example that skin is a sense organ.
3. State of functions of sweat glands.

Concept XXI: The skeleton protects the inner body parts and gives definite shape to the body.

Tools of Evaluation: VSA, SA.

1. Name the organs of skeletal system.
2. Enumerate functions of skeletal system.
3. Diagrammatically show the position of skull, backbone, ribs and limb bones in human man.

Concept XXII: Animals use different organs for locomotion.

Tools of Evaluation: MCQ, VSA.

1. The organs of locomotion in man are
 - A. arms.
 - B. legs.
 - C. backbone.
 - D. eyes.
2. The organs of locomotion in flying birds are
 - A. wings.
 - B. feet.
 - C. eyes.
 - D. feathers.
3. The organs of locomotion are not used to
 - A. move from one place to another.
 - B. eat food.
 - C. protect themselves.
 - D. hid themselves from danger.

4. State functions of organs of locomotion (legs, wings, fins.)
5. Name organs of locomotion in deer, dog and parrot.

Concept XXIII: All parts of the body are essential for proper functioning.

Tools of Evaluation: MCQs, VSA.

1. A boy with broken thumb cannot
 - A. hold the pencil.
 - B. buy the pencil.
 - C. see the pencil.
 - D. break the pencil.
2. A blind person cannot
 - A. smell.
 - B. see.
 - C. touch.
 - D. hear.
3. An uprooted plant
 - A. does not bear flowers.
 - B. is not green.
 - C. dies.
 - D. does not grow.
4. You can not walk with fracture in
 - A. hand.
 - B. nasal bone.
 - C. foot.
 - D. arm.
5. Hear failure causes
 - A. death.
 - B. slow blood circulation.
 - C. paralysis of half body portion.
 - D. rise in body temperature.
6. Name three organs of the human body and state the functions affected by the loss or absence of each of these parts.
7. All the organs of body must function properly. Explain why?

Unit IX

Air

S.No.	Concepts	Skills/Competencies	Specific tasks/Behaviours	Tools of Evaluation
1	2	3	4	5
I.	Air is all around us.	Recognises that air is all around us.	Observes following phenomenon: Flying of birds. Burning of coal in houses, etc. Leaves are carried away by wind. Feels soothing effect when he sits in garden. Blowing of balloons. Filling air inside a tube.	Flying MCQ
II.	Air is matter. (i) It occupies space. (ii) It has mass.	Recognizes that air occupies space and it has mass. On the basis of experiments concludes that air occupies space and has mass.	Performs an experiment to show that air occupies space e.g. filling balloons with air, replacement of air by water in jar. Performs an experiment with the help of a bladder (football), cycle pump and a balance. He observes that bladder increase in size and in weight after filling with air.	MCQ

1	2	3	4	5
III.	Air is mixture of nitrogen, oxygen, carbondioxide, water, vapour and dust particles.	<p>Recognizes that air is a mixture and not a single substance.</p> <p>Infers that air consists of at least two gases out of which one helps in burning the candle; other does not help in burning.</p> <p>Draws inference that air contains dust particles.</p> <p>Observes and draws inference that air contains CO_2.</p> <p>Draws inference that air contains N_2.</p>	<p>Performs an experiment to show that air is a gaseous mixture and not one substance.</p> <p>Performs an experiment with the help of a bladder (football) or cycle pump. Size and weight increase after filling with air.</p> <p>He cites examples e.g. when a beam of light or sun rays pass through a small hole in a room, dust particles are seen floating in air.</p> <p>Performs an experiment to show that air contains CO_2 e.g. take clear lime water in a jar and blow air with a bicycle pump into the lime water. He observes that lime water turns milky.</p> <p>Performs an experiment to show that air contains N_2 e.g. lighted candle is inserted in a jar kept in water trough containing concentrated caustic potash solution. After a while candle stops burning and the solution rises in the jar.</p> <p>Performs an experiment to show that air is essential for burning.</p>	<p>MCQ SA Checklist</p> <p>MCQs VSA SA</p> <p>MCQ VSA SA</p>
IV.	Air is essential for burning.	<p>Infers and understands that air is essential for burning.</p>		
V.	Air is essential for all living beings.	<p>Infers that air contains substances essential for life.</p>	<p>Lists different constituents of air.</p> <p>Performs an experiment to show that O_2 is essential for respiration of insects/rat etc.</p>	

1	2	3	4	5
VI.	Water contains dissolved air.	Infers that water contains dissolved air.	Fishes and other water animals breathe air in water.	M
VII.	Plants consume CO_2 as their food.	Infers that sunlight is essential for photosynthesis in plants.	He observes that sun light is essential for the photosynthesis in plants. Performs an experiment to show that sunlight is essential for photosynthesis.	
VIII	Air is useful to human beings.	Concludes that air is useful in many ways.	Observes and records that air is useful in respiration, burning, as compressed air, drying agricultural products, movement of soil, boats, gliders, parachutes and aircrafts, wind mill, CO_2 cycle.	

Concept I: Air is all around us

1. Maximum amount of air is present
 - A. over the surface of earth.
 - B. inside the earth.
 - C. inside sea water.
 - D. near the sun.
- 2.* Air cannot be seen because it
 - A. is odourless.
 - B. has mass.
 - C. occupies space.
 - D. is colourless.

Concept II: Air is matter

3. Air is matter because it
 - A. occupies space.
 - B. has mass.
 - C. is present everywhere.
 - D. occupies space and has mass.
4. Which of the following statements is *not* correct about a tumbler half filled with water.
 - A. The tumbler contains water.
 - B. The tumbler contains air.
 - C. The tumbler contains water and air.
 - D. There is vacuum inside the tumbler.

Concept III: Air is a mixture

5. Air contains largest proportion of
 - A. oxygen.
 - B. nitrogen.
 - C. carbon dioxide.
 - D. helium.
6. Lighted candle is inserted in an inverted jar kept in a water trough. After a while candle stops burning and water rises in a jar. The jar mainly consists of
 - A. nitrogen and carbon dioxide.
 - B. water vapour and carbon dioxide.
 - C. nitrogen and oxygen.
 - D. oxygen and water vapour.

7. The constituent of air which turns lime water milky is
 - A. oxygen.
 - B. nitrogen.
 - C. carbon dioxide.
 - D. water vapour.
8. The exhaled air becomes foggy in cold winter but not in summer. Explain the reason.
9. Describe an experiment with a labelled diagram to show that dust particles float in air.
10. Describe an experiment to show that air contains nitrogen.
11. The gas jars, A, B and C contain carbon dioxide, oxygen and nitrogen, respectively. How will you identify the gas jar which contains carbondioxide?

Concept IV: Air is essential for burning.

12. The component of air essential for burning of coal is
 - A. nitrogen.
 - B. carbon dioxide.
 - C. oxygen.
 - D. argon.
13. Three gas jars contain separately oxygen, carbondioxide and nitrogen. How will you identify the gas jar which contains oxygen?
14. A specific variety of coal is used by Halwai (sweet maker) in their fire box (sigri). If the sigri is sufficiently disturbed, it gets extinguished. Explain with reasons.
15. A piece of paper burns but a bundle of paper burns readily at edges only. Explain.

Concept V: Air is essential for all living beings.

16. Divers go deep into the sea with oxygen cylinder because
 - A. there is no sufficient air.
 - B. it helps in coming out of sea.
 - C. it kills aquatic animals.
 - D. it helps in removing poisonous gases.
17. All living beings breath air to
 - A. be happy.
 - B. be health.
 - C. live long.
 - D. remain alive.

18. Mountaineer Mr. Ten Singh Norgay carried oxygen cylinder to Mount Everest because
- it made comfortable his movement at high altitude.
 - it helped in breathing as air is thinner at the altitude.
 - it helped in breathing as air is denser at the altitude.
 - it was used for cooking food at Mount Everest.

Concept VI: Water contains dissolved air.

19. The animal which utilises the dissolved air for breathing is
- whale.
 - rat.
 - cat.
 - fish.
20. The aquatic animal that *does not* depend on dissolved air for breathing is
- torpedo.
 - dog fish.
 - crocodile.
 - dog fish.

Concept VII : Plants consume carbon dioxide as their food.

21. Plants prepare their food by photosynthesis. The essential condition for photosynthesis is
- water, carbondioxide and oxygen.
 - water, carbondioxide and light.
 - oxygen, carbondioxide and light.
 - water, oxygen and light.
22. Photosynthesis does not take place in the
- presence of carbon dioxide.
 - absence of light.
 - presence of water.
 - presence of light.
23. The photosynthesis takes place in the presence of
- green pigment of the plant.
 - oxygen.
 - nitrogen.
 - helium.

Concept VIII: Air is useful to human beings

24. For comfort of a patient who suffers from asthma, doctors give artificial
A. nitrogen.
B. argon.
C. oxygen.
D. carbon dioxide.
25. Put a cup of water and small amount of food in a jar. Put some house flies in the jar and close it with a cover slip. After some days house flies die due to lack of
A. water.
B. food.
C. carbon dioxide.
D. oxygen.
26. People feel cool in summers beneath the fan. This is because it
A. gives cooler air.
B. rotates air faster.
C. helps in rapid evaporation of sweat.
D. is run by electricity.
27. Which one of the following is not a correct use of compressed air?
A. scooter tyres
B. room coolers
C. digging and mining
D. drilling of wells.
28. Compressed air is not used in
A. digging.
B. mining.
C. breaking stones.
D. balloons.
29. Name the substances and conditions essential for photosynthesis.
30. The factories have chimneys about 30 m high. Explain with reasons what will happen if height of chimney is reduced to 3 metres?
31. The clothes dry faster in summer than in rainy season. Explain.
32. Explain while winnowing in agricultural fields two separate heaps of husk and grains are formed and further the heap nearer to you is that of grain.
33. Give three steps for completion of carbon dioxide cycle in nature.

Checklist

The teacher is advised to follow the checklist while the experiments are being done by the students.
Note: These experiments should be done individually, not in groups so as to encourage effective learning of the laboratory techniques.

Checklist for an experiment to show that air contains Nitrogen.

- | | Yes | No |
|---------------------------------------------------------------------|-----|----|
| 1. The jar is placed in an upright position. | | |
| 2. The jar is marked in five equal parts. | | |
| 3. Marking on the jar is done from the bottom and not from top. | | |
| 4. The water inside the jar and in the trough is at the same level. | | |

Water

S.No.	Concepts	Skills/Competencies	Specific tasks/Behaviours	Tools of Evaluation
1	2	4	4	5
I.	Water is essential for life.	Recognises that bodies of animals contain water. Realises that animals need water to live.	<p>Observes that blood of animals contain water.</p> <p>Observes that urine contains water.</p> <p>Observes that sweat contains water.</p> <p>Recalls that human body has 70% water by weight.</p> <p>Observes that dead bodies of animals dry up by losing water.</p> <p>Observes that animals drink water.</p> <p>He himself drinks water everyday.</p> <p>He feels uncomfortable when he does not drink water.</p> <p>Observes that other human beings also drink water.</p> <p>Observes that human beings use water for cooking, bathing and cleaning purposes.</p> <p>Infers that animals including man need water to live.</p>	<p>VSA, MCQ</p> <p>SA, VSA, MCQ</p> <p>SA, VSA, MCQ</p>

1	2	3	4	5
			Observes that when small plants are cut or leaves are removed, water oozes out.	
			Performs experiments for above observations.	
			Observes that in summer the land surfaces look barren and in rainy season a lot of plants grow all around.	SA, VSA, MCQ
			Generalises that all animals and plants need water and cannot live without it.	
			Performs experiments to show that plants and animals consume water.	
			Explains that plants and animals cannot live without water.	
			Describes expts. to show that animal and plant bodies contain water.	
			Observes that water is available from rivers, lakes, ponds, streams, etc.	SA, VSA, MCQ
			Lists the sources of water present in his locality (Town/Village).	
			Observes and reads in maps that plenty of water is there in oceans and 2/3 of earth's surface is covered by oceans.	
			Observes that wells are dug to fetch water.	SA, VSA, MCQ
			Observes that tube wells are sunk to fetch water.	
			Observes that there are springs which give water.	
II.	We get water from various sources.	Recognises that water is available from land surfaces.		
		Recognises that water is available from underground resources		

1	2	3	4	5
		Recognises that water is available from rains and snow.	Observes that rain water fills the ponds, lakes, rivers. Observes that plenty of rains cause floods. Recognises that snow glaciers melt down in summer.	
III.	Water through taps form a perennial source.	Understands that tap water is supplied from perennial source.	Realises that a perennial water source like river or lake or well is essential for tap water supply to a town or a village. Lists tap-water source in his own town and neighbouring town/village.	LA, SA, VSA, MCQ
			Observes that freshly cut fire wood does not catch fire and if it is put to fire, then water comes out of it. Performs the above experiment.	SA, VSA, MCQ
			Observes that freshly cutwood, small plants, etc. are dried up in sun and then used as fire wood. Infers that wet wood does not catch fire as it contains water whereas dry wood catches fire as it does not contain water.	
			Observes through expt. that plants give out water (transpire) Expt: Take a small plant in a polythene bag and tie it up so that air does not enter. After few hours droplets of water will be seen inside the polythene bag.	
			Explains the term transpiration.	
			Understands that plants need water.	

1	2	3	4	5
			<p>Observes that in the kitchen garden seeds are planted and watered when the seed germinates and gradually grows up to a plant.</p> <p>Observes that garden plants are watered regularly.</p> <p>He does the expt. with some seeds (grams). Observes them growing rapidly if they are properly watered and not growing if they are not watered regularly.</p> <p>Observes at home that grams, green grams do germinate if they are soaked.</p> <p>Observes that irrigation arrangements are there in farms and fields.</p> <p>Observes that moulds (non-flowering plants) grow in leather shoes rapidly in rainy season.</p> <p>Observes that bread, wet flour develop moulds quickly in rainy season.</p> <p>Observes that small plants dry up and die out if water supply is cut/stopped.</p>	SA, VSA, MCQ

Understands that water through tap is supplied after it is purified. with the sketch of the town water supply system and explains the function of each unit.

Differentiates between the process of purification involved in town water supplies; (a) surface water source (b) underground water source.
Understands various process involved in the purification of water in town-water supply system.

LA, SA,
VSA, OTR

Observes that suspended impurities (floating mud, etc) should be removed first. Observes that alum is added to settle down the suspended clay particles.

Observes that in settling down process, settling of mud/clay takes few hours in large setting tanks, which is called sedimentation.

Observes that water from setting tanks goes to filter beds consisting of sand and gravel.

Observes that the filtered water is then sent to chlorinating tank for the purpose of killing the germs.

Observes that the disinfected water (colled as potable water) is pumped to over-head reservoirs (water towers) for supply to the houses.

Describes process of purification of water in town-water supply system

Names the common disinfectants.

IV. Water has many properties. Understands that water exists in three states: solid, liquid and gaseous.

Cites examples of three states of water: ice, snow, hail stones, water moisture, cloud, mist, fog, dew, steam, water vapour.

Performs expts. to see the three states of water. Performs expts. to see processes of evaporation and condensation.

1	2	3	4	5	
	Understands the processes of evaporation, condensation, melting and freezing and compares them.		Performs expts. to see the process of melting and freezing. Performs expts. to observe the boiling point of water, melting point of ice, (freezing point of water). Defines/explains the terms evaporation, condensation, freezing, melting, boiling point, melting point, freezing point. Observes that salt, sugar, soap, glucose, etc. dissolve in water. Cites examples of few more soluble substances of daily use. Observes that some solids are not soluble in water e.g. sand, charcoal, sulphur, etc. Cites examples of few more insoluble substances.	VSA, MCQ	
	Understands that water dissolves many solid substances.		Defines/explains the terms 'Soluble' and 'Insoluble'. Tests a substance to check whether it is soluble or not.	SA VSA MCQ	
	Understands that water dissolves some liquids also.		Observes that water dissolves liquids like milk, alcohol, lime juice, orange, squash, curd, etc. Tests a given liquid's solubility in water. Observes that liquids like veg. oil, castor oil, etc. do not dissolve in water and form a separate layer. Cites examples of few more liquids which dissolve in water.		

1	2	3	4	5
		Understands that water dissolves some gases too.	Observes through expt. water dissolves some gases like ammonia, chlorine, etc. Observes through expt. that when water is heated it gives out dissolved air in the form of bubbles.	SA
			Observes that when bottled cold drinks are opened, bubbles of dissolved gases come out vigorously.	VSA MCQ
			Performs simple experiments to see that aquatic plants and animals breathe in dissolved oxygen in water.	
		Understands that more quantity of substances dissolve on heating water.	Observes through expt. that more of salt/sugar dissolves when water solution is heated.	
		Compares the affects of temperature on the solubility of solids and gases in water.	Observes that in case of solids, more solid dissolves on heating the solution, whereas more of the dissolved gas comes out of the solution on heating.	
			Cites examples of few more gases which are soluble in water.	
			Observes that the water level in ponds, rivers, lakes, wells, etc, gradually decreases after the rainy season and almost dries up in the summer season.	SA VSA MCQ
			Observes that wet clothes dry up sooner in summer as compared to winter and rainy season.	
			From the above observations infers that evaporation takes place in nature and it is more rapid at higher temperature.	
			Conducts simple expts. to see the evaporation process as well as its rapidity.	
V.		Water cycle is a natural process.	Understands that evaporation occurs in nature.	

1	2	3	4	5	
		Understands that condensation also occurs in nature.	<p>Observes clouds in the sky.</p> <p>Observes fog and dew in winter mornings.</p> <p>Observes that the air blown out of the mouth becomes foggy in winter season.</p> <p>Observes that while cooking steam gets condensed to droplets of water on the under surface of the lids of cooking vessels.</p> <p>Performs expts. to see how steam coming out of a kettle forms clouds and air blown out of the mouth falling on a mirror forms clouds.</p> <p>From the above observations and expts. infers that water vapours from the sea, lakes, ponds, rivers etc. go high up into the atmosphere and condense to form clouds since the air temperature is less at higher altitudes.</p>	SA VSA MCQ	
		Understands the cause of the rain fall.	<p>Recognizes that monsoon winds accumulate the clouds and further cooling of clouds causes rains.</p> <p>Recognizes that a part of rain water is absorbed by the soil and is stored as underground water and the other parts fill the tanks, rivers, ponds, etc. which is surface water.</p>		
		Understands the cause of formation of snow, hailstones, dew etc.	<p>Observes and records experience of snowfalls, hailstones, dew formation, fogs, etc.</p>		

5

Observes that water is frozen to form ice in refrigerators and icecream factories.

Infers that condensation and freezing of water is the cause of formation of snow, hailstones, ice, etc.

Observes that water is carried from the earth surface to the atmosphere by the process of evaporation.

Water vapours get condensed to form clouds.

Monsoon wind makes the clouds together and causes the rain.

The rain water comes back to the earth. Describes the water cycle in nature.

Draws the sketch of water cycle.

SA, VSA,
MCQ

Performs expt. with hard water (sea water or saline water) and repeats the expt. with rainwater, tapwater and soap water.

Observes that foam (lather) is formed quickly in case of rainwater and not with sea water.

Infers that former is hard water and later is soft water.

Lists sources of hard and soft water.

Understands the cyclic movement of water from earth to atmosphere and back to the earth.

VI. Hard water and soft water have different properties and uses.

Distinguishes between hard and soft water.

1	2	3	4	5	
		Understands that presence of Ca and Mg salts makes water hard	Takes 100 ml. of that sample of water and on evaporating it in a beaker, observes that some solid residue is left behind. The above expt. gives an idea, that the residue is the cause of hardness. Performs expt. by adding soap solution to (a) tap water containing common salt and (b) tap water containing Ca and Mg chlorides. Observes that lather is formed with much difficulty with sample (b) and easily with the sample (a). From this expt. infers that hardness is due to dissolved Ca and Mg salts.	SA VSA MCQ	
		Recognises that hard water is unsuitable for use in certain cases.	Realises that hard water is unsuitable for washing. Observes that prolonged use of hard water in boilers in factories and vessels at homes leaves hard residues. This causes many disadvantages.		
		Understands that hard water can be made soft by different methods and then it may be used.	Observes in expts. that hard water can be made soft either by boiling or by adding washing soda. Tests the above through experiments. Defines/explains 'hard' and 'soft' water. Identifies hard and soft water. Lists the causes of hardness. Describes methods for the removal of hardness.		

1	2	3	4	5
VII.	Uses of water	Understands the uses of water in daily life.	Realizes that water is essential for cooking, drinking, bathing, cleaning etc.	
			Observes that life processes of plants and animals are carried out through water medium e.g. digestion, blood circulation, sweating, urination etc. Plants transport raw materials and prepare food through water. ✓	
		Recognizes that water is essential for photosynthesis.	Illustrates that water is essential for photosynthesis with the help of which plants prepare food.	
		Recognizes that water is essential for industries.	Realizes that water is essential for many industries.	SA, VSA
			Lists the industries which require much water—Textile, Dye, Drugs, Paper, Fertilizer, etc.	MCQ
			Realizes that the above mentioned industries are situated on river banks.	
		Recognizes that water is essential for agriculture.	Explains that water is essential for agriculture.	
			Illustrates that irrigation facilities are being made for better crops.	
			Lists the crops that need	
			(a) more water	
			(b) less water for better crops.	

5

4

3

2

1

Machines move by water.

Knows that flowing water turns the wheel which runs machines like flour mill.
Knows that flowing water moves the turbines which generate electricity.
Lists the names of some Hydro-electric projects in the country.

Recognizes water as a medium of transport for goods and men.

SA
VSA
MCQ

Recognizes that water provides recreation and sports facilities.

Understands that water provides livelihood.

SA
VSA
MCQ

Recognizes water as a medium of transport of seeds, pollens, germs.

SA
VSA

Observes that certain fruits and seeds are transported through water, which aids dispersal of a species from one place to another. Cites examples of seeds and fruits carried by water.
Observes pollen grains of aquatic plants floating in water that cause pollination.
Cites examples.

Explains that certain disease germs are carried away by water and cause water-borne disease.

Cites examples of water-borne diseases. Observes that on boiling, on adding potassium permanganate, bleaching powder, chlorine gas, germs are killed and the water becomes fit for drinking.

Realizes the importance of water for animals, plants and men.

Realizes its importance in industries, agriculture, medicine, recreation, transport, etc.

Describes various uses of water and explains its importance in all walks of life.

LA
SA
VSA
MCQ

Observes that garbage, sewage, industrial effluents, etc. contaminate water.

Cites examples of the above.

Explains that washing clothes, cleaning utensils, bathing cattle, throwing dead bodies of animals etc. contaminate water.

Cites examples of the above.

Explains what is polluted water.

Describes how water is polluted.

Recalls that polluted drinking water causes many stomach diseases.

Recalls that bathing in polluted water causes many skin diseases.

Explains that industrial effluents thrown into rivers cause harm to men, animals, fishes, plants and crops.

Appreciates the multifarious role of water.

Understands that water gets polluted by various means and use of polluted water is harmful.

Water pollution

VIII.

1	2	3	4	5
	Understands the methods of controlling pollution of water		Lists and explains the cause of pollution and harms of polluted water and how to check it. Cities examples of checking water pollution of local ponds, rivers, tanks, lakes etc. e.g., not to throw garbage, not to bathe cattle, not to wash clothes in the water resources, not to clean utensils, not to throw plants etc. Lists the characteristics of polluted water—it is quite often coloured, foul smelling, peculiar taste compared to potable water, which is colourless, odourless, and tasteless. Recalls that for domestic use tap water is the best.	SA VSA MCQ
	Realizes that water fetched from rivers ponds, wells, etc is not safe for drinking and needs purification and disinfection.		Recalls that bleaching power, potassium manganate, may be added to pond, lake well water. Knows that local health authorities may be requested to prevent pollution. Knows that Industrial effluents should be treated chemically before being allowed to flow into rivers. Knows that wells should be covered to check pollution.	SA VSA MCQ

5

4

3

2

Knows that uneducated people should be made aware of the causes, effects and preventive measures of pollution
 Draws a diagram depicting the causes of pollution of various sources which are quite common in India.
 Visits a factory and sees how its effluents are treated chemically.

SA
 VSA
 MCQ
 SA, VSA

Cities examples of natural resources.
 Realizes that water from ponds, lakes, rivers, wells can be used by men for various purposes.

Realizes that sea-water, although available in plenty is of no use to men for domestic uses.

Realizes that water fetched from other natural sources (except sea) is also scarce.
 Cities the means of conserving water to overcome the scarcity e.g. collection of rain water in tanks, building underground storage, construction of small dams, checking deforestation and encouraging afforestation so as to increase the rain fall, avoiding unnecessary wastage of potable water e.g. keeping taps open, and using the required amount of water.

IX. Conservation of water is a natural resource., and is freely available.

Understands the scarcity of water and realizes the importance of its conservations.

Concept I: Water is essential for life.

Tools of Evaluation: Fill in the blanks, Short answer type questions.

Fill in the blanks

1. Water is _____ for all living things.
2. Human body contains _____ per cent water by weight.
3. _____ is required for germination of seeds.
4. Germination of seeds is much _____ in rainy season as compared to summer.
5. Plants would _____ if not watered regularly.

Short answer type

6. Plants dry up if not watered regularly. Explain why?
7. A child suffering from diarrhoea is advised to take more liquid food and water. Is this advice in your opinion correct or not and why?
8. You are given two bundles of wood. One of these bundles 'A' contains fresh tree stem whereas the other bundle 'B' contains dried wood. Which of these two bundles should a halwai select for cooking food and why?
9. Suggest an experiment to show that plants contain water.
10. Suggest an experiment to show that water is essential for life.

Concept II : We get water from various sources

Tools of Evaluation : MCQ and S.A. type.

1. The source of surface water is
A. tubewell.
B. well.
C. spring.
D. snow.

2. Which of the following is not a source of surface water?
 - A. Sea
 - B. Well
 - C. Pond
 - D. River.
3. Which of the following is not a source of underground water?
 - A. Well
 - B. Spring
 - C. Tubewell
 - D. Pond.
4. The portion of earth surface covered by sea is about
 - A. 50%.
 - B. 84%.
 - C. 66%.
 - D. 75%.
5. Sea water can be used for
 - A. cooking.
 - B. washing clothes.
 - C. agriculture.
 - D. fisheries.

Short Answer Type

6. In a village river is the only source of water. How can this water be made fit for drinking?
7. Why cannot sea water be used in agriculture ?
8. Pond water is not safe for drinking. Explain why?
9. List the sources of water on earth.
10. Distinguish between sea water and river water. Which of these can be used at home and why?

Concept III: Tap water is drawn from a permanent source.

Tools of Evaluation : SR, MCQ, SA.

Student Record : Students may visit waterworks department and observe how water from river is purified and supplied through taps. Students may be asked to make model of 'supply of drinking

water' which may be evaluated for understanding and skill.

MCQs

1. In water supply system, chlorinating tank removes
 - A. suspended impurities.
 - B. dissolved salts.
 - C. germs.
 - D. all the above.
1. The tap water is generally drawn from
 - A. river.
 - B. pond.
 - C. lake.
 - D. sea.
3. In water supply to taps, the suspended impurities are removed by
 - A. boiling.
 - B. filtration.
 - C. sedimentation.
 - D. chlorination.
4. Tap water should not be used in
 - A. cooking
 - B. drinking.
 - C. washing utensils.
 - D. agriculture.
5. Tap water contains
 - A. germs .
 - B. suspended impurities.
 - C. dissolved salts.
 - D. none of the above.

Short Answer Type

6. Draw a labelled diagram of water supply system through taps.
7. When an epidemic spreads, you are advised to use tap water after boiling. Explain why?

Concept IV : Water shows various properties.

Tools of Evaluation : MCQ, Fill in the blanks, Short answer type.

MCQ

1. Which of the following substances dissolve in water?
 - A. Charcoal
 - B. Talcum Powder
 - C. Soap
 - D. Wheat flour
2. Which of the following substances does not dissolve in water?
 - A. Alcohol
 - B. Milk
 - C. Fruit juice
 - D. Coconut oil.
3. The conversion of steam into water is known as
 - A. evaporation.
 - B. melting.
 - C. freezing.
 - D. condensation.
4. Ice converts into water on heating. The process is known as
 - A. freezing.
 - B. melting.
 - C. evaporation.
 - D. condensation.
5. In fog, water is in
 - A. solid state.
 - B. liquid state.
 - C. gaseous state.
 - D. all the three states.
6. On heating, the amount of common salt dissolved in water
 - A. increases.
 - B. decreases.
 - C. remains same.
 - D. increases first and then decreases.
7. Snowfall occurs as a result of
 - A. condensation.
 - B. evaporation.
 - C. melting.
 - D. freezing.

8. Rain is a result of
- evaporation of water.
 - condensation of water.
 - condensation than evaporation of water.
 - evaporation than condensation of water.

Fill in the Blanks

9. Water freezes at _____ $^{\circ}\text{C}$ and boils at $^{\circ}\text{C}$ _____.
10. Water exists in _____ states, namely, _____, _____, and _____.
11. The conversion of water into steam takes place at _____ $^{\circ}\text{C}$ and the process is known as _____.
12. The conversion of steam into water takes place at _____ $^{\circ}\text{C}$ and the process is known as _____.
13. Water changes to ice at _____ $^{\circ}\text{C}$ and the process is known as _____.
14. Ice changes to water at _____ $^{\circ}\text{C}$ and the process is known as _____.
15. Oxygen in _____ water.

Short Answer Type

16. "Water level in ponds and wells goes down in summer". Explain why?
17. Suggest an experiment to show that water contains dissolved air.
18. Name five substances that dissolve in water and five substances that are insoluble in water.

Concept V : The change of water from one form to another over and over again makes the water cycle in nature.

Tools of Evaluation: Fill in the blanks, Short answer type.

Fill in the Blanks

1. Clouds are formed due to _____ and then _____ of sea water.
2. When snow melts, water flows into _____.

3. Soil _____ a part of rain water.
4. Water cycle is due to change of _____.
5. Heat from _____ warms the ocean water.

Short Answer Type

6. Describe the water cycle in nature.
7. Diagrammatically show the water cycle in nature.
8. Explain how rain water again becomes cloud and results in rain.
9. Monsoon is more in Kerala and less in Rajasthan. Explain why?
10. Suggest an experiment to show the process of cloud formation.

Concept V: Hard and Soft Water

Tools of Evaluation : Fill in the blanks, Short answer type.

Fill in the Blanks

1. Water from _____ gives lather with soap.
2. Water from _____ does not give lather with soap.
3. Hardness of water can be removed by treating it with _____.
4. Boiling of water removes _____ of water.
5. Hard water is unfit for _____ and _____.
6. Salts present **hard** water are _____ and _____.
7. Impurities present in soft water are _____ and _____.
8. Sea water has _____ taste.
9. Soft water is _____ for industrial use.
10. The hardness of water is due to _____ dissolved in it.

Short Answer Type

11. Sometimes prolonged use of immersion heater causes formation of white deposits on it. Explain this observation.
12. You are given two samples of water. One of these is from sea and other is from river. How will you identify river water sample?
13. Distinguish between hard water and soft water.
14. Suggest two methods to remove hardness of water.
15. Why cannot hard water be used for drinking purposes.

Concept VII: Water is used in everyday life for various purposes.

Tools of Evaluation : Short Answer Type.

Short Answer Type

1. List various activities in daily life which require water.
2. Explain that animals need water to remain alive.
3. In what ways water is helpful for plants ?
4. List diseases that can be spread by water.
5. What precautions and measures should be taken in order to prevent water borne diseases?
6. How can water be used for recreation by village people ?
7. Name two animals and two plants which live in water.
8. Explain how water helps in transport.

Concept VIII : Water pollution

Tools of Evaluation : Short Answer Type

1. List three sources of water pollution in villages.
2. List three sources of water pollution in cities.

3. How can water pollution be minimized in villages ?
4. How can water pollution be reduced in cities?
5. How is water pollution harmful for man ?

Concept IX : Conservation of water

Tools of Evaluation : MCQ, SA.

MCQ

1. 'Conservation of water' means
 - a) storing water in tanks.
 - b) purification of water.
 - c) reducing pollution of water.
 - d) economic use of water.
2. 'Water' can be saved by
 - a) drinking less water.
 - b) making canals for irrigation.
 - c) building underground storage.
 - d) growing more trees.
3. Forests help in increasing the
 - a) water pollution.
 - b) rainfall.
 - c) level of water in rivers.
 - d) fuel supply.
4. Potable water should be used for
 - a) drinking.
 - b) industries
 - c) bathing animals.
 - d) agriculture.
5. Construction of dams helps in
 - a) conservation of water.
 - b) growing forests.
 - c) rainfall.
 - d) collecting rainwater.

Short Answer Type

6. Explain how forests help in overcoming scarcity of water.
7. Suggest two measures by which wastage of potable water can be minimised.
8. Why is it necessary to save water when two-third surface of earth is covered by water?
9. Explain the importance of constructing small dams in the country.

Energy

S.No.	Concepts	Skills/Competencies	Specific tasks/Behaviours	Tools of Evaluation
1	2	3	4	5
I.	The ability to do work is called energy.	Identifies energy in different work situations. Defines energy. Establishes relationship between work and energy.	Observes that energy is required to do any kind of work e.g. walking, lifting weight, etc. Observes that every change involves energy. Demonstrates that the work done by a body depends on the energy in body. Demonstrates that the work done on a body is stored as its energy.	SA, VSA
II.	Work is done when force is applied on a body.	Defines work. Establishes relationship between work, force and distance moved. Distinguishes between physical, mental and mechanical work.	Observes that work is done when one pulls, pushes or moves an object. Cites examples of physical, mental and mechanical work. Demonstrates that mechanical work depends upon the distance moved by an object and the magnitude of force applied to move the object.	MCQ, SA
III.	There are different forms of energy, such as, mechanical energy,	Distinguishes between different forms of energy. Applies the knowledge of different forms of energy in solving day-to-day problems.	Identifies different forms of energy Cites examples of different forms of energy from daily life. Illustrates use of different forms of energy.	MCQ, VSA Matching type

1	2	3	4	5
	chemical energy, heat energy, sound energy and electrical energy.		Demonstrates that work is done by all these forms of energy.	
			Differentiates between different forms of energy.	
			Prepares models/appliances using different forms of energy.	
IV.	One form of energy can be converted into another form.	Understands that one form of energy can be converted into another.	Cites examples of conversion of one form of energy into another.	MCQ, SA
		Illustrates that one form of energy can be converted into another	Demonstrates that one form of energy can be converted into another.	
V.	Energy can be obtained from various sources.	Recalls various sources of energy.	Lists sources of various forms of energy.	MCQ, VSA, SA
		Applies knowledge of sources of energy in solving day-to-day problems.	Describes how different forms of energy can be obtained from these sources.	
VI.	Sources of energy can be renewable or non-renewable	Differentiates between renewable and non-renewable sources of energy. Identifies renewable sources of energy. Identifies non-renewable sources of energy.	Lists renewable sources of energy.	MCQ, VSA SA
			List non-renewable sources of energy. Illustrates working of some renewable and some non-renewable sources of energy. Describes design and functions of solar devices, windmill, falling of water, biomass etc. as source of energy.	

ENERGY

Concept I: The ability to do work is called energy.

Tools of Evaluation: SA, VSA

1. List five work situations from everyday life where energy is transformed from one system to another.
2. Identify energy changes in the following works.
 - (a) When you play football
 - (b) When you pull a bucket of water from a well
 - (c) When you move a box through a distance of 4 ft.
 - (d) When water is boiled on a gas burner.
3. Explain with the help of example that energy is required to do work.
4. Suggest an experiment to show that energy is stored in a body (stone) when it is raised to a certain height.
5. Two stones of masses 50 gms and 100/gms are raised to a height of 50 cms. Which of these two stones will do more work on falling and why?
6. Ram carried 20 kgs of weight through a distance of 20 metres and Shyam carried 20 kgs. of rice through a distance of 40 metres. Which one of the two spent more energy and who did more work?

Concept II : Work is done when force is applied on a body.

Tools of Evaluation : MCQ, SA.

MCQs

1. Which of the following activities involve mechanical work?
 - A. Lifting school bag.
 - B. Learning a lesson
 - C. Hitting against a wall.
 - D. Reciting a poem.
2. Which of the following activities involve mental work?
 - A. Solving a mathematical quiz.
 - B. Pulling a bucket of water from well.
 - C. Applying force to move a heavy object.
 - D. Standing on bus-stop with luggage in hand.

3. In which of the following work situations, the mechanical work done is of maximum magnitude?
 - A. Box 'A' weighing 20 kg is moved through a distance of 10 metres.
 - B. Box 'B' weighing 20 kg is moved through a distance of 5 metres.
 - C. Box weighing 10 kg is moved through a distance of 10 metres.
 - D. Box weighing 10 kg. is moved through a distance of 10 metres.
4. Which of the following works require minimum energy?
 - A. Throwing a ball of 20 gms to a distance of 100 metres.
 - B. Lifting a weight of 20 gms through a distance of 10 metres.
 - C. Throwing a toy weighing 10 gms from a distance of 100 metres.
 - D. Pulling a toy weighing 10 gms to distance of 10 metres.
5. Four objects with same weight were released from four different points of an inclined plane to hit a matchbox placed at the bottom of the inclined plane. In which of the following cases, the matchbox was moved to the greatest distance?
 - A. Object released from a height of 10 metres of the inclined plane.
 - B. Object released from a height of 5 metres of the inclined plane.
 - C. Object released from a height of 8 metres of the inclined plane.
 - D. Object released from a height of 2 metres of the inclined plane.
6. Object 'A' was moved through a distance of 5 metres by applying force A. Force B pushed the same object to 5 metres further away. Explain whether the magnitude of two forces is same, more or less.
7. Explain that the amount of work done by two equal forces in moving the same object through different distances is different.

Concept III: There are different forms of energy, such as mechanical energy, chemical energy, heat energy, sound energy, electrical energy, solar energy, wind energy, water energy.

Tools of Evaluation: MCQ, VSA, Matching type.

MCQs

1. The energy stored in a stretched rubber is
 - A. chemical energy.
 - B. mechanical energy.
 - C. heat energy.
 - D. light energy.
2. Which of the following is a source of chemical energy?
 - A. Food
 - B. Sun

- C. Gas burner
 - D. Running water.
3. Conversion of water to steam is due to
 - A. mechanical energy.
 - B. chemical energy.
 - C. heat energy.
 - D. solar energy.
 4. Tail of the Halley's comet increases as it comes nearer to sun because
 - A. tail is a shadow of the comet due to sun.
 - B. sunlight pushes away dust particles around the comet.
 - C. tail is formed due to gravitational force of sun.
 - D. the comet has charged particles around it.
 5. The energy produced due to thunder is
 - A. light energy.
 - B. sound energy.
 - C. electrical energy.
 - D. solar energy.
 6. Electrical energy is used in
 - A. photography.
 - B. solar cooker.
 - C. lifts.
 - D. pendulum clocks.
 7. List two work situations where chemical energy is required to do the work.
 8. Name two appliances which work with the help of electrical energy.
 9. State two uses of heat energy and solar energy each.
 10. Match the forms of energy in column A with the work situations in column B.

Column A	Column B
(a) Mechanical energy	(i) Working of diesel engine.
(b) Chemical energy	(ii) Working of steam engine.
(c) Heat energy	(iii) Flour mill working.
(d) Electrical energy	(iv) Playing football

Concept IV: One form of energy can be converted into another form.

Tools of Evaluation: SA, MCQ.

VSA

11. Name two fossil fuels and two non-fossil fuels.
12. Name three fuels that can be obtained from petroleum.

S.A.

13. Outline the steps in generation of electrical energy in thermal power station.
14. Explain that solar energy is essential for life.
15. Why is it important and essential to save fossil fuels? Explain.

Concept VI: Sources of energy can be renewable or non-renewable.

Tools of Evaluation: MCQ, VSA, SA

1. Fossil fuels are non-renewable source of energy because
 - A. these take millions of years to form.
 - B. these are formed from remains of plants and animals.
 - C. once used, these are not available again.
 - D. these are sources of chemical energy.
2. Water is a renewable source of energy because
 - A. it is available in pure form.
 - B. it does not pollute the environment.
 - C. it is essential for life.
 - D. it can be used again and again.
3. Distinguish between renewable and non-renewable sources of energy.
4. Name two renewable sources of energy.
5. Name two non-renewable sources of energy.

Unit XII

Balance in Nature

S.No.	Concepts	Skills/Competencies	Specific tasks/Behaviours	Tools of Evaluation
1	2	3	4	5
I.	Plants and animals depend on each other.	<p>Recalls basic needs of animals.</p> <p>Analyses various sources from where animals fulfill their basic needs of food, shelter and clothing etc.</p>	<p>Lists things (materials) that are essential for life (animals).</p> <p>Lists things/materials he needs in his everyday life.</p> <p>Explains the term 'consumers'.</p> <p>Illustrates that animals are 'consumers'.</p> <p>Explains the term 'Herbivorous'.</p> <p>Prepares a list of 'Herbivorous animals'.</p> <p>Explains the term 'Carnivorous'.</p> <p>Makes a list of 'Carnivorous animals'.</p> <p>Explains the term 'Omnivorous'.</p> <p>Lists 'Omnivorous animals'.</p> <p>Lists materials and their sources, which are used in making houses, clothes and medicines etc.</p>	MCQs, Matching type SA type of questions

2	3	4	5
	Recognizes plants as source of food, shelter, clothing, medicine etc.	Lists fruits, leaves, grains, stems, roots etc., (various parts of plants) that are used as food by animals.	
		Names plants which are used in making houses.	
		Names plants which produce cotton, (clothes).	
		Names plants used in medicines.	
		Lists various plant products that he uses in his every day life.	
	Understands the dependence of animals on plants.	Explains that animals depend on plants for food, shelter, clothing, medicine etc.	
	Understands the dependence of plants on animals.	Explains that destroying plants/forests adversely affects animal life.	
		Explains how animals help in pollination, dispersal of fruits and seeds.	
		Lists some common manures obtained from animal sources.	
		Illustrates how man helps in irrigation, better cultivation, and production of fertilizers etc.	
	Realizes that interdependence of plants and animals is essential for maintaining balance in nature.	Illustrates how interdependence of plants and animals helps in maintaining the balance in nature.	
		Explains how growing plants or destroying plants affects the balance in nature.	

1	2	3	4	5	MCQs, Short Answer Type of questions.
II.		<p>Various food chains found in nature help in maintaining the balance in nature. (The whole process of who eats whom is called food chain).</p>	<p>Hypothesizes that transfer of energy takes place from one living organisms to another in the form of food.</p> <p>Hypothesizes that energy flows from non living things such as sunlight, soil, air and water to living organisms.</p>	<p>Observes that energy is stored in plants in the form of food and this food when eaten by animals gives them energy.</p> <p>Infers on the basis of observations that transfer of energy takes place from one living organism to another.</p> <p>Observes that non-living things such as sunlight, soil, air and water are used by plants to prepare their food.</p> <p>Infers that energy of non-living materials is transferred to living organisms.</p> <p>Explains the process of 'photosynthesis' in plants.</p>	<p>Analyses the process of food preparation by plants.</p> <p>Recognizes that herbivorous animals get food and energy from plants</p> <p>Recognizes that some carnivorous animals get food and energy from herbivorous animals.</p> <p>Lists some herbivorous animals and the foods they eat.</p> <p>Lists some carnivorous animals and the food they eat.</p>

2

3

4

5

	<p>Observes and recognizes various food chains in nature.</p> <p>Understands the role of decomposers in food chains.</p> <p>Relates various food chains to balance in nature.</p>	<p>Describes some food chains found in nature.</p> <p>Explains the process of decomposition of plants and animals.</p> <p>Names the living organisms that help in the process of decomposition.</p> <p>Explains the role of decomposers in food chains.</p> <p>Explains how various food chains help in maintaining the balance in nature.</p> <p>Illustrates that destroying plants would adversely affect the life of animals.</p>	<p>Verifies and confirms on the basis of observations that destroying plants results in starvation and death of animals, and destroying animals harms plants and other animals.</p> <p>Explains how plants and animals balance each other.</p> <p>Explains the term 'imbalance' in nature.</p> <p>Reasons as to why balance is necessary in nature.</p> <p>States human actions that disturb balance in nature.</p> <p>States and explains human actions that can help in maintaining the balance in nature.</p>	<p>Short Answer type of questions</p>
III. Balance is essential in nature.	<p>is Hypothesizes that in nature plants, animals and various other forms balance one another and also keep a check on all others.</p> <p>Infers that balance is essential in nature.</p> <p>Understands what is imbalance in nature.</p> <p>Understands that human actions of deforestation and killing animals disturb the balance in nature.</p> <p>Suggests positive human actions that help in maintaining the balance in nature.</p>			

1	2	3	4	5
IV.	Any process which makes the air, water and soil harmful to the living beings is called pollution.	Understands the process of pollution. Recalls various types of pollutions such as air pollution, water pollution, soil pollution and noise pollution.	Explains the process of 'pollution' in nature. Defines air pollution, water pollution, soil pollution and noise pollution. States factors responsible for various kinds of pollutions. Cites examples of air pollution, water pollution, soil pollution and noise pollution.	MCQs, Short Answer type of questions
		Analyses the causes of pollution.		
		Understands that pollution, causes 'imbalance' in nature. Suggests steps/methods of reducing pollution in nature.	Illustrates how pollution is harmful to human beings, other animals and plants. Relates various kinds of pollutions to 'imbalance in nature'. Illustrates how man is responsible for pollution and 'imbalance in nature'. States various methods/precautions which human beings should follow in order to reduce pollution in nature.	

Concept I: Plants and animals depend on each other.

Tools of Evaluation: MCQ, Matching type, short answer type.

MCQs

1. Which of the following is a plant product?
 - A. Butter
 - B. Vegetable.
 - C. Egg.
 - D. Milk.
2. Which of the following is not a plant product ?
 - A. Bread
 - B. Salad
 - C. Spices
 - D. Ghee.
3. Which of the following is an animal product ?
 - A. Paper
 - B. Rubber
 - C. Lather
 - D. Gum.
4. Which of the following is not an animal product ?
 - A. Lac
 - B. Wool
 - C. Cod-liver oil
 - D. Coir mats.
5. Herbivorous animals
 - A. eat plants.
 - B. eat animals.
 - C. eat both plants and animals.
 - D. prepare their own food.
6. Man is
 - A. herbivorous.
 - B. carnivorous.
 - C. omnivorous.
 - D. none of the above.

7. Which of the following is a herbivorous animal ?
 A. Cat
 B. Elephant
 C. Tiger
 D. Dog.
8. Which of the following is a carnivorous animal ?
 A. Horse
 B. Goat
 C. Frog
 D. Squirrel.
9. Which of the following is an omnivorous animal ?
 A. Monkey
 B. Dog
 C. Rabbit
 D. Deer.
10. Animals are helpful to plants because
 A. plants eat animals.
 B. animals give protection to plants.
 C. animals help plants in pollination.
 D. animals supply carbondioxide to plants.

Matching Type

11. Match the foods given in column 'B' with animals given in column 'A'.

Column A (Animals)

- (i) Lizard
 (ii) Cat
 (iii) Langur
 (iv) Rabbit
 (v) Man

Column B (Foods)

- (a) Fish
 (b) Cockroach
 (c) Rat
 (d) Grass
 (e) Gram

12. Match the products given in column B with animals/plants given in column A.

**Column A
(Plants/animals)**

- (i) Teak plant
 (ii) Cotton plant
 (iii) Wheat

**Column B
(Products)**

- (a) Milk
 (b) Bread
 (c) Shirt

- | | |
|---------------|-----------|
| iv) Cow | (d) Honey |
| (v) Honey bee | e) Doors |

SA

13. Explain why plants are called 'producers' and animals 'consumers'.
14. Distinguish between herbivorous, carnivorous and omnivorous animals.
15. List herbivorous, carnivorous, and omnivorous animals, ten each.
16. State uses of plants to human life.
17. Explain how plants help in maintaining the balance in nature".
18. State uses of animals to plant life.
19. Explain in about 200 words that "destroying plants and killing animals disturbs the balance in nature"
20. What is the role of "Man in protecting plant and animal life"? Explain.

Concept II: Various food chains found in nature help in maintaining the balance in nature. (The whole process of who eats whom is called food chain).

Tools of Evaluation: MCQ, Short answer type.

MCQs

1. Man gets energy to work from
 - A. Sun.
 - B. plants.
 - C. water.
 - D. air.
2. Plants prepare food from
 - A. sunlight, soil and air.
 - B. animal decay.
 - C. chlorophyll.
 - D. plant decay.
3. Select the correct food chain from the following.
 - A. Grass _____ Deer _____ Snake.

- B. Grains_____ Rat_____ Cat.
C. Grass_____ Frog_____ Snake.
D. Frog_____ Pig_____ Men.

4. Which of the following food chains is not found in nature?

- A. Grass_____ Cow/(milk)_____ Men.
B. Housefly_____ Frog_____ Snake.
C. Plant_____ Deer_____ Lion.
D. Plant_____ Deer_____ Elephant.

5. If all the plants are destroyed,

- A. herbivorous animals would die.
B. carnivorous animals would die.
C. omnivorous animals would die.
D. all the animals would die.

SA

6. Explain the process of transfer of energy from sun to plants and from plants to animals.
7. Describe two 'food chains' found in nature.
8. Explain the role of 'decomposers' in food chains.
9. Illustrate with the help of one example that food chains help in maintaining the balance in nature.

Concept III: Balance is essential in nature.

Tools of Evaluation : Short answer type questions.

SA

1. Explain the term 'balance in nature'.
2. Give reasons as to why it is essential to maintain balance in nature.
3. Explain how plants and animals balance each other's activities.
4. State human activities that disturb balance in nature.

Concept IV: Any process which makes the air, water and soil harmful to the living beings is called pollution.

Tools of Evaluation: MCQ, Short answer type questions.

MCQ

1. Destroying forests would
 - A. increase air pollution.
 - B. increase water pollution.
 - C. increase soil erosion.
 - D. decrease soil pollution.
2. Release of chemical gases from industries
 - A. increases air pollution.
 - B. decreases air pollution.
 - C. increases water pollution.
 - D. decreases water pollution.
3. Growing more plants would
 - A. reduce dust particles in air.
 - B. increase oxygen in air.
 - C. increase carbon-dioxide in air.
 - D. decrease oxygen in air.
4. The warning on cigarettes is that it is
 - A. injurious to health.
 - B. gives strength.
 - C. contains tobacco.
 - D. inexpensive method of relaxation.
5. Which of the following will multiply most in the absence of scavengers?
 - A. Housefly
 - B. Rats
 - C. Scorpion
 - D. Dragon-fly.

VSA

6. Name three sources of air pollution in cities.
7. Name three sources of water pollution in villages.
8. Name two diseases caused by polluted air and two diseases caused by polluted water.

SA

9. Illustrates with the help of examples that various kinds of pollutions cause imbalance in nature.

Unit XIII

The Universe

S.No.	Concepts	Skills/Competencies	Specific tasks/Behaviours	Tools of Evaluation
1	2	3	4	5
I.	Different heavenly bodies are present in the sky.	<p>Observes the clear cloudless night sky and identifies different objects seen.</p> <p>Knows that sun is also a star and some stars are even bigger than the sun.</p> <p>Understands the difference between a star and a planet.</p> <p>Knows the device used to observe distant heavenly bodies</p> <p>Knows that a huge strip of faintly glowing light observed across the sky from north to south is called Milky way.</p>	<p>Lists different types of heavenly bodies observed in the sky.</p> <p>Visits planetarium and records his observations</p> <p>Observes sky with naked eye and through telescope.</p> <p>Lists the differences between a star and a planet.</p> <p>Names the device used for observing distant heavenly bodies.</p> <p>Explains the term 'Galaxy'</p> <p>Names the galaxy to which we belong.</p>	<p>Student Record</p> <p>Objective Type Questions and VSAQ</p>
II.	Distances between heavenly bodies from one another and from the earth are very large.	<p>Understands that smallness and brightness of stars is due to their very large distances from the earth.</p>	<p>Explains that the stars appear small and faint due to their large distance from earth.</p>	<p>Objective Type Question</p>

1	2	3	4	5	VSAQ, SAQ
			<p>Knows that the distances of heavenly bodies from the earth are very large.</p> <p>Understands that another unit called light year is used to measure such large distances.</p> <p>Recalls light year as a unit of distance.</p> <p>Expresses the distance of sun from earth in terms of this unit.</p> <p>Knows the next nearest star and brightest star and their distances from Earth in terms of light year.</p> <p>Appreciates the vastness of universe.</p>	<p>Explain the order of distances between heavenly bodies.</p> <p>Names the unit of distance used to measure the distances of heavenly bodies.</p> <p>Defines the unit, light year.</p> <p>Calculates the distance of sun from earth in kms.</p> <p>Names the star nearest to earth which is next to sun.</p>	
III.	All objects in the universe are in continuous motion.			<p>Names the brightest star in the sky.</p> <p>Names three heavenly bodies in the sky which are in motion.</p>	Objective Type Qs.
			<p>These bodies also revolve about their own axes.</p>	<p>Lists two heavenly bodies which are revolving about their axes.</p>	VSAQ
IV	Some stars in the sky form groups of recognizable shape called constellation.		<p>Observes the night sky for few days continuously.</p>	<p>Infers that some stars in the sky are formed in groups which are of recognizable shape.</p>	Student observation, Objective Type of questions and SAQs
			<p>Recognises some of the important constellations.</p> <p>Recalls that all the stars in the constellation always stay together.</p>	<p>Defines the term constellation</p> <p>Names two important constellations observed in the sky-giving their corresponding mythological names.</p>	

1	2	3	4	5
		Understands that the shape of the constellation always remains the same.	Draws the shapes of these constellations.	Objective Type Qs.
V.	Pole star does not change its position in the sky.	Observes and infers that there is a star in the sky which does not change its position and which is almost isolated. Identifies pole star.	Locates and identifies the pole star in the sky.	VSAQ
			Makes a chart showing Ursa Major and Polestar.	SAQ
			Lists the characteristics of pole star.	ETQ
VI.	Stars and constellations are in motion from east to west.	Recalls that earth rotates from west to east. Knows that stars and constellations appear to move from east to west in the sky. Observes the apparent motion of trees and buildings while sitting in moving bus or a train.	States the direction of rotation of earth about its axis. States the direction of apparent motion of stars and constellations in the sky. Explains this apparent motion of stars and constellations on the basis of daily life observations.	MCQs, SA
VII.	The sun and the heavenly objects which revolve around it form the solar system.	Observes that: One of the heavenly objects in the sky after sun set is comparatively very bright. There is another heavenly body which appears reddish in colour. Knows that: These objects are different from stars, revolve around the sun and are called planets. Including earth, there are nine different planets revolving around the sun which form solar system.	Identifies the planet Venus. Identifies the planet Mars. Lists two important characteristics of a planet. Lists the names of the planets forming solar system. Draws a chart of solar system.	VSAQ Objective Qs. SAQ

1	2	3	4	5
VIII.	Different planets have different sizes, periods of rotation and revolution	Knows that: Mercury has minimum and maximum period of revolution. Jupiter has minimum and maximum period of rotation. Jupiter has largest size of all the planets. Recalls that moon goes around the earth. Knows that: Satellites are objects moving around the planets. There are natural as well as artificial satellites.	Names the planets having largest size, minimum period of rotation, maximum period of rotation, minimum period of revolution, maximum period of revolution. Explains the term satellite. Names the natural satellite of Earth. Distinguishes between a natural and an artificial satellite. Names three artificial satellites. Appreciates the purposes of launching artificial satellites. Lists four uses of artificial satellites.	VSAQ Objective Type Questions
IX.	Satellites are smaller objects which move around some of the planets.			Objective Type, MCQs, SA
X.	In addition to planets and asteroids, there are some other heavenly objects which revolve around the sun.	Knows that in addition to planets and asteroids, there are other heavenly bodies going around the sun called comets. Recalls the name of a heavenly body which appeared in early 1986. Differentiates between a meteor and a meteorite. Understands the cause of burning of meteors in the earth's atmosphere.	Names the heavenly objects other than planets and asteroids moving around the sun. Names the comet seen in early 1986. Lists two differences between a meteor and a meteorite. Explains the burning of meteors in the atmosphere.	VSAQ Objective Type Question SAQ

Concept I : Different heavenly bodies are present in the sky.

Tools of Evaluation : Students record, Objective Type of Questions and VSA Qs.

Student record - Students may be encouraged to observe sky in the night, day, evening and early morning hours and to record the observations. Students may also be encouraged to visit planetarium and see more stars through telescope wherever such facilities are available. They record the pictures seen at planetarium and observed through telescopes.

MCQs

1. The instrument used to see heavenly bodies is called

- A. microscope.
- B. bioscope.
- C. telescope.
- D. binocular.

2. A Galaxy is a

- A. group of few stars.
- B. family of planets.
- C. family of satellites.
- D. big cluster of stars.

3. The Milky way extends in the sky from

- A. north to south.
- B. east to west.
- C. west to east.
- D. south to north.

4. The Milky way is

- A. the path between two stars.
- B. the path between two planets.
- C. the path between the sun and a planet.
- D. cluster of countless stars including the sun.

5. The planet which is largest in size is

- A. Mercury.
- B. Jupiter.
- C. Earth.
- D. Mars.

Fill in the blanks

6. The Sun is one of the _____ in our _____.
7. _____ is a huge strip of faintly glowing light from _____ to _____ across the sky.

VSA

8. Name three heavenly bodies observed in the sky on a clear night.
9. Why can not you see stars in the day time ?

SA

10. List two differences between a star and planet.

Concept II : Distances between heavenly bodies from one another and from the earth are very large.

Tools of Evaluation : Objective Type Questions, Very Short Answer Questions, Short Answer Questions.

MCQs

1. The distance between two nearest stars is of the order of
- A. meters.
 - B. few kilometers.
 - C. thousand kilometers.
 - D. crores of kilometers.
2. Light year is a unit of
- A. time.
 - B. distance.
 - C. brightness of light.
 - D. speed of light.
3. Distance between the Sun and the Earth is about
- A. 100 kms.
 - B. 1,000 kms.
 - C. 15,000 kms.
 - D. 15 crore kms.

4. Time taken by light to reach earth from Sun is
 - A. 10 seconds.
 - B. 1.3 hours.
 - C. 8.3 minutes.
 - D. 24 hours.
5. Speed of light is
 - A. 30 kms./Sec.
 - B. 300 kms./Sec.
 - C. 30,000 kms/sec.
 - D. 3,00,00 kms./sec
6. The star nearest to Earth is
 - A. Sirus.
 - B. Proxima Centauri.
 - C. Sun.
 - D. Pole star.

Fill in the blanks

7. One light year is the _____ travelled by light in _____.
8. The _____ is about 8.3 light minutes from _____.
9. The unit to measure distance between stars and other heavenly bodies is _____.

VSA

10. Why is light year used as a unit of distance for measuring distance of heavenly bodies?

11. Define the term 'light year'

SA

12. Light from Sun takes approximately 8.3 minutes to reach Earth. If the speed of light is 3 lakhs kilometers per second, calculate the distance of Sun from Earth.

Concept III : All objects in the universe are in continuous motion.

Tools of Evaluation : Objective Type Questions and Very Short Answer Questions.

MCQs

1. The Sun is revolving
 - A. on its own axis.
 - B. around Earth.
 - C. around moon.
 - D. pole star.
2. Milky way is
 - A. continuously moving.
 - B. static.
 - C. periodically moving.
 - D. moving from south to north.
3. The sun moves at the speed of
 - A. 3,00000 kilometers per second.
 - B. 220 kilometers per second.
 - C. 15 crore kilometers per second.
 - D. 8.3 kilometers per second.

Fill in the blanks

4. *All planets and stars, except the pole star appear to move from _____ to _____ because the earth moves from _____ to _____.

VSA

5. Name three heavenly bodies in the sky which are in continuous motion.
6. Name three heavenly bodies in the sky which are rotating round their axis.

Concept IV : Some stars in the sky form groups of recognizable shape called constellations.

Tools of Evaluation : Students Observation Record, Objective Type of Questions and SAQs.

Students Record - Students observe various constellations in the sky and draw the shapes of these constellations. Identify and name the constellations on the basis of the shapes drawn such as Ursa Major or Saptarishi, Orion.

MCQs

1. A constellation is a group of
 - A. planets.
 - B. satellites.
 - C. stars.
 - D. mars.
2. Other names for Ursa Major are
 - A. Big Dipper, Great Bear and Pole star.
 - B. Pole-star, Great Bear, and Saptarishi.
 - C. Sapatarishi, Big Dipper and Pole star.
 - D. Big Dipper, Great Bear and Saptarishi.
3. Number of stars forming Ursa Major is
 - A. 7.
 - B. 13.
 - C. 1.
 - D. 9.
4. Mythological name for Orion is
 - A. Saptarishi.
 - B. Kalpurush.
 - C. Dhruva tara.
 - D. Big Dipper.
5. Orion appears like
 - A. an aeroplane.
 - B. bird.
 - C. hunter.
 - D. dipper.
6. Orion is a
 - A. star.
 - B. satellite.
 - C. constellation.
 - D. comet.
7. The constellation saptarishi appears to move from
 - A. east to west.
 - B. west to east.
 - C. south to north.
 - D. north to south.

Fill in the blanks

8. The constellation used for locating the position of the pole-star is _____.
9. The mythological name of Ursa Major is _____.
10. The _____ of a constellation always remains the same.
11. Ursa major appears to move from _____ to _____ at different times during the night.
12. Orion is a _____ in which there are greater number of _____ stars than in any other known constellation.

VSA

13. Define the term 'constellation'.
14. Name two constellations in the sky which can be easily located. Write their corresponding mythological names.

SA

15. Draw the shapes of Saptarishi and Orion showing the position of different stars in these constellations.

Concept V : Pole star does not change its position in the sky and is almost isolated.

Tools of Evaluation : Objective Type Questions, Short Type of Questions.

MCQs

1. Pole star is also called
 - A. Dhruva-tara
 - B. Kalpurush.
 - C. Orion.
 - D. Saptarishi.

SA

2. Describe the procedure of locating pole-star in the sky.

Concept VI : Stars and constellations are in motion from east to west.

Tools of Evaluation : SA and VSA type Questions.

SA

1. Explain why stars and constellations appear to move from east to west in the sky?

VSA

2. In which direction do stars appear to move in the sky?

Concept VII : The sun and the heavenly objects which revolve around it form the solar system.

Tools of Evaluation : Objective Type Questions, VSA and Short Answer Questions.

MCQs

1. The nearest planet to the sun in the solar system is

A. Mercury.
B. Pluto.
C. Neptune.
D. Venus.

2. The farthest planet from the sun in the solar system is

A. Mercury.
B. Mars.
C. Venus.
D. Pluto.

3. The smallest planet of the solar system is

A. Earth.
B. Mercury.
C. Venus.
D. Pluto.

4. The solar system consists of sun and

A. nine planets.
B. nine satellites.
C. eight planets.
D. eight satellites.

5. Earth is a planet that revolves round

- A. Sun.
- B. Moon.
- C. Mercury.
- D. Jupiter.

SA

6. Arrange the following planets in ascending order of their distances from sun.
Venus, Mercury, Mars, Jupiter, Earth, Pluto, Neptune, Uranus and Saturn.
7. How can Venus and Mars be located in the sky?
8. List three characteristics of a planet.
9. Draw a chart of solar system showing relative position of planets with respect to sun.

Concept VIII : Different planets have different sizes, different periods of rotation and revolution.

Tools of Evaluation : Objective, Very Short and Short Answer Type of questions.

MCQs

1. The planet having minimum period of rotation is
 - A. Earth.
 - B. Pluto.
 - C. Saturn.
 - D. Jupiter.
2. The planet having maximum period of rotation is
 - A. Venus.
 - B. Earth.
 - C. Mars.
 - D. Mercury.
3. Which of the following planets has maximum period of revolution ?
 - A. Saturn
 - B. Pluto
 - C. Earth
 - D. Neptune.

Concept IX : Satellites are smaller objects which move around some of the planets.

Tools of Evaluation : Objective Type and Short Answer Type of Questions.

MCQs

1. Heavenly bodies revolving around the planets are called
 - A. meteors.
 - B. meteorites.
 - C. comets.
 - D. satellites.
2. Astroids are heavenly bodies moving around the sun between the orbits of
 - A. Earth and Venus.
 - B. Mars and Jupiter.
 - C. Venus and Mars.
 - D. Mars and Jupiter.
3. Which of the following statements is true?
 - A. All planets have same period of revolution.
 - B. All planets have same period of rotation.
 - C. All planets move around the sun.
 - D. All planets move around their satellite.
4. Which of the following statements is true?
 - A. Earth is a natural satellite of Moon.
 - B. Moon is a natural satellite of Earth.
 - C. Earth is an artificial satellite of Moon.
 - D. Sun is a natural satellite of Earth.
5. Choose the only correct statement out of the following:
 - A. Earth has no natural satellite.
 - B. Earth has one natural satellite.
 - C. Earth has many natural satellites.
 - D. Earth has one artificial satellite.
6. Comets belong to the family of
 - A. asteroids.
 - B. solar system.
 - C. planets.
 - D. meteors.
7. Halley's comet was seen in early 1986 after
 - A. 76 days.

- B. 76 yrs.
 - C. one year
 - D. 8.3 days.
8. Mars appear
- A. reddish.
 - B. yellowish.
 - C. blue.
 - D. white.

SA

9. Explain why a meteor burns on entering Earth's atmosphere.
10. Differentiate between a meteor and meteorite.

Concept X : In addition to planets and asteroids, there are some other heavenly objects which revolve around the sun.

Tools of Evaluation : Objective type Questions, Short Answer type Questions.

MCQs

1. Meteors are the heavenly bodies moving around
 - A. Sun.
 - B. Earth.
 - C. Moon.
 - D. Jupiter.
2. Meteorites are heavenly bodies which
 - A. burn completely in earth's atmosphere.
 - B. burn partially in earth's atmosphere.
 - C. produce bright streak of light.
 - D. reach earth without burning.
3. The brightest star other than sun is
 - A. Proxima Centauri.
 - B. Alpha Centauri.
 - C. Sirius.
 - D. Pole-star.
4. Which of the following stars is also known as morning and evening star?

- A. Venus.
 - B. Mars.
 - C. Saturn.
 - D. Jupiter.
5. Shooting stars are also called
- A. Meteors.
 - B. Meteorites.
 - C. Asteroids.
 - D. Comets.
6. Moon completes one revolution around the Earth in
- A. 27.3 days.
 - B. 28 days.
 - C. 30 days.
 - D. 8.3 days.
7. Which of the following artificial satellites was launched first by India?
- A. Rohini
 - B. Apple (APPLE)
 - C. Bhaskara.
 - D. Aryabhata.

Fill in the blanks

8. A satellite is a body which _____ round _____.
9. Moon is a _____ of _____.
10. Earth is a _____ of _____.

VSA

11. Name four artificial satellites launched by India.

SA

12. Differentiate between a natural and an artificial satellite.
13. Write any five uses of an artificial satellites.

Table of Specifications for Class VI Science (Scheme of Formative Evaluation)

Behaviour		Scientific Products			Processes of Scientific Enquiring				Manual Skills		Attitude and Interests			
Content		Knowledge	Comprehension	Application	Observing and Measuring	Seeking a problem and seeking ways to solve it	Interpreting data and formulating generalizations	Testing, and revising theoretical model	Skills in using common laboratory equipment	Performance of common laboratory techniques	Acceptance of Scientific enquiry as way of thought	Attitude towards Social and moral implication of Science	Interest in performing scientific activities	Interest in reading scientific literature
1. Science in Everyday Life		✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
2. Things Around Us		✓	✓	✓	✓	✓	✓					✓	✓	✓
3. Separation of Substances		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	
4. Measurement		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	
5. Changes Around Us		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	
6. Motion, Force and Machines		✓	✓	✓	✓	✓	✓				✓	✓	✓	
7. The Living World		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
8. Structure and Functions of Living Body		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
9. Air		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
10. Water		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
11. Energy		✓	✓	✓	✓	✓	✓	✓						✓
12. Balance in Nature		✓	✓	✓							✓	✓		
13. The Universe		✓	✓	✓	✓						✓			

APPENDIX II

Tools of Evaluation Units	Test Items			Teacher's Observation		Student's Record		Writing Report of an Experiment Project
	Objective	VSA	SA	E	Checklist	Rating Scale	Collecting and Recording data	Preparing Model charts
1. Science in Everyday Life	✓	✓					✓	
2. Things Around Us	✓	✓	✓				✓	✓
3. Separation of Substances	✓	✓	✓		✓		✓	✓
4. Measurement	✓	✓	✓		✓		✓	
5. Changes Around Us	✓			✓			✓	✓
6. Motion, Force and Machines	✓	✓	✓				✓	
7. The Living World	✓	✓	✓				✓	✓
8. Structure and Functions of Living Body	✓	✓	✓				✓	✓
9. Air	✓	✓	✓	✓	✓		✓	✓
10. Water	✓	✓	✓	✓			✓	
11. Energy	✓	✓	✓					
12. Balance in Nature	✓			✓				
13. The Universe	✓	✓	✓	✓			✓	✓

APPENDIX III

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APPENDIX IV

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Key to questions

Units I to XIII

UNIT I

Concept I

1. (C) 2. (D) 3. (D) 4. (A) 5. (D) 6. a) quicker b) diseases c) quicker d) telephone e) television f) media g) travel h) Nylon i) copper j) kerosene. 7. a) (vii) b) (x) c) (viii) d) (ix) e) (i) f) (ii) g) (v) h) (iii) i) (iv) j) (vi) 8. Any five e.g. vaccine, satellite, diesel engine, nylon, radio-active substances. 9. Horses, Bullockcarts, Trains, Automobiles, Aeroplanes. 10. Small pox, Polio, Diptheria, Tuberculosis, Whooping cough. 11. Modes of travel, Media, Telecommunications. 12. Fertilizers, Pesticides, Improved variety of seeds, Improved variety of crops. Irrigation facilities, Technological devices. 13. Manual through messengers, postal, telecommunication, telephone, wireless, satellite, Electronics. 14. Shelter, Water supply, Communication, Increase in food supply, Storage and preservation, Electricity, physical amenities, Entertainment, Health.

Concept II

1. (D) 2. (A) 3. To kill bacteria. 4. Take two potted plants. Water one of these plants regularly and do not water second plant. Observe that plant which is not watered dies and the plant which is watered grows. 5. Plant seeds in sand and soil separately, water these regularly and record the growth of plants. 6. Observation, identifying problem, gathering information or collecting data, formulating hypothesis, testing hypothesis, conclusions.-

Concept III

1. a) destructive b) Pencillin c) Bacterial diseases d) Pasturization e) irrigation f) insecticides g) food production h) observing minute objects. 2. Nuclear missiles, Chemical bomb. 3. Carbon dioxide and Sulphur dioxide. 4. Electricity, Communication 5. Alexander Fleming - pesticides, Madam Curie - Radio-active substances. 6. Advantages-i) Better utilization of natural resources. ii) Availability of physical facilities. Disadvantages-i) Pollution ii) Health hazard to workers. 7. Better irrigation facilities, fertilizers, improved variety of seeds and crops, better storage, pesticides, technological devices. 8. Communication through printed matter, audio-visual devices, satellite, facilities of travelling and learning know-how from distant people. 9. Shelter, physical amenities, drinking water, more food etc.

Concept IV

1. Student record 2. (i) Holland (ii) Edward Jenner (iii) Penicillin (iv) Nagarjuna 3. (i) J.C. Bose,

India (ii) Louis Pasteur, France (iii) Madam Curie's, Poland (iv) Edward Jenner, England 4. (i) T (ii) F (iii) F (iv) T (v) T (vi) T (vii) T (viii) T (ix) F (x) T. 5. J.C. Bose, Plant sensitivity, Nagarjuna, Ayurveda.

UNIT II

Concept I

1. C 2. D 3. A 4. A 5. Man made materials: Nylon, Plastic, Glass, Paper. Naturally occurring materials: Water, Timber, Common salt, Grains. 6. (a) Non-living (b) Non-living (c) Living (d) living (e) Non-Living (f) Non-living (g) Living (h) Living (i) Living (j) Non-living 7. Pencil, Book, Eraser 8. a) To wear b) To wear c) To wear d) To cut e) To wear f) To stitch. 9. Objects can be easily identified and located. Such as books at home and soap in a grocery shop. 10. Use of the objects is taken as criterion e.g. books are placed at one place, clothes together and sports material at one place. Second criteria is the material and method of storing.

Concept II

1. Student record. 2. B 3. A 4. C 5. A 6. A 7. C 8. B 9. A 10. a. volume b. mass, space c. mass d. space e. made up of matter. 11. a) Book b) Pencil c) Flower d) Sugar 12. Air, Water, Chair, Table, Plant 13. a) Difference of weight between an inflated ball and an air filled ball. b) Difference between volume of an inflated ball and an air filled ball. c) As above b. 14. Water has mass and occupies space.

Concept III

1. C 2. C 3. D 4. A 5. A 6. Condensation 7. Freezing 8. Crystallization 9. melted 10. melting 11. evaporation 12. Evaporation and then condensation 13. Vapours into liquid 14. Water 15. Wax, Ghee, Sugar 16. Water, alcohol, Kerosene oil 17. Air, Oxygen, Carbondioxide 18. Steam, water, ice.

Concept IV

1. D 2. A 3. A 4. A 5. D 6. (a) insoluble (b) soluble (c) insoluble. (d) iron (e) transparent (f) opaque (g) lighter (h) heavier (i) sinks in (j) floats on 7. Sodium Chloride, Amonium Chloride, Washing soda, Sugar, Alcohol: (all five soluble in water). 8. Chalk and sand insoluble in water, common salt insoluble in mustard oil, sugar insoluble in kerosene, alcohol insoluble in kerosene. 9. Wood, Plastic, Steel. 10. (a) Solid (b) Solid (c) Liquid (d) Solid (e) Gas (f) Gas (g) Liquid (h) Gas. 11. (a) Lighter (b) Heavier (c) Heavier (d) Heavier (e) Lighter (f) Heavier (g) Lighter (h) Lighter. 12. (a) Opaque

(b) Opaque (c) Transparent (d) Transparent (e) Transparent (f) Transparent (g) Opaque (h) Opaque
 (i) Transparent. 13. (a) Gas (b) Gas (c) Liquid (d) Liquid (e) Solid (f) Gas (g) Solid (h) Solid (i) Liquid
 (j) Liquid (k) Liquid. 14. (a) Insoluble (b) Insoluble (c) Insoluble (d) Soluble (e) Insoluble (f)
 Insoluble (g) Soluble (h) Insoluble (i) Soluble (j) Soluble (k) Insoluble (l) Soluble (m) Insoluble.

Concept V

1. B 2. C 3. A 4. A 5. A 6. B 7. B 8. B 9. B 10. A 11. (a) Matter (b) 107 (c) Atoms (d) 92 (e) Nitrogen
 (f) Sodium and Chlorine. 12. Gold, Diamond, Oxygen found in free state. Copper, Iron, Aluminium
 found in combined state. 13. Gold-solid, Water-liquid, Oxygen-gaseous 14. Silicon 15. Carbon 16.
 Carbon, Sulphur, Gold, Silver, Iron, Aluminium, Oxygen, Hydrogen, Nitrogen, Chlorine.

Concept VI

1. C 2. B 3. B 4. D 5. A 6. C 7. D 8. (a) F (b) T (c) T (d) F (e) T (f) F (g) T (h) T (i) F (j) T 9.
 Metals — Iron, Copper, Aluminium, Gold. Silver. Non-Metals — Carbon, Sulphur, Oxygen,
 Nitrogen, Hydrogen. 10. (a) Metal (b) Metal (c) Non-metal (d) Non-metal (e) Non-metal (f) Non-
 metal (g) Metal (h) Metal (i) Non-metal (j) Metal

Concept VII

1. C 2. B 3. A 4. C 5. D 6. D 7. A 8. D 9. A 10. A 11. (a) F (b) T (c) T (d) T (e) T (f) T (g) F (h) F
 (i) F (j) T 12. Sodium Chloride, Washing Soda, Sugar, Water. These do not show properties of con-
 stituent elements. 13. Air, Tea, Jaggery, Smoke. These show properties of constituent elements 14.
 Student record

Concept VIII

1. D 2. B 3. C 4. C 5. A 6. A 7. C 8. B 9. A 10. C 11. (a) F (b) T (c) F (d) T (e) T (f) F (g) F (h) T
 (i) T

Concept IX

1. A 2. B 3. A 4. B 5. A 6. A 7. D 8. A 9. C 10. A 11. A 12. Free movement of molecules in a gas.
 13. Solids have definite shape whereas liquids do not have fixed shape. 14. Free movement of
 molecules in a gas 15. Due to different arrangement of molecules. In a solid, molecules are closely
 packed whereas in a gas molecules are loosely packed.

UNIT III

1. C 2. A 3. B 4. D 5. B 6. C 7. C 8. A 9. C

10. Ice, Common Salt, Wheat flour, Sugar, Milk.

11. Air- O_2 CO_2 , N_2 , Dust, moisture, pollutants. Jaggery — Sucrose, Mineral water. Tea-Water, milk, sugar, tea leaves. Soil—sand, clay, various salts and minerals. Sea water—Water, salts of Mg, Ca and Na, sand, soil, germs.

12. Heat both the mixtures. Ammonium Chloride sublimes on heating.

13. To kill and remove germs present in the water.

Concept II

1. D 2. B 3. C 4. A 5. C 6. A 7. D 8. D 9. B 10. B 11. A 12. A 13. C 14. B 15. D 16. A 17. B

18. (a) Distillation (b) Separating with the help of a separating funnel. (c) Crystallization. (d) Decantation. (e) Sublimation

19. Diagram for filtration. 20. Diagram for sublimation.

21. Checklist for filtration

22. Checklist for sublimation

23. Checklist for distillation.

} All 'yes' responses

Concept III

1. A 2. A 3. C 4. D 5. B 6. B 7. D 8. A

9. (a) In filtration a filtering medium is used for separating insoluble impurities from a liquid. Whereas in decantation the top layer is poured into another container leaving insoluble impurities in the first container.

(b) Evaporation is used to separate solid dissolved in a liquid wherein liquid evaporates on heating leaving behind the solid substance.

Crystallization is used to obtain a pure sample from an impure sample. The pure solid is

dissolved in hot liquid and insoluble impurities are removed by filtration. Filtrate on cooling gives crystals of pure solid.

- (c) Sublimation is the method for separating a volatile substance from a mixture whereas distillation is the process of separating two miscible liquids with different boiling points.

10. (i) Powdering the salt. (ii) Preparation of solution (iii) Filtration. (iv) Evaporation.

Unit IV

Concept I

1. (i) Height (ii) weight (iii) Chest 2. Time 3. Kg. 4. Celsius 5. Meter tape 6. D 7. C 8. B 9. D 10. A

11. (i) Cloth measured in meters.
(ii) Milk measured in litres.
(iii) Body temp. measured in Celsius.
(iv) Body weight measured in Kg.
(v) Vegetables weighed in Kg.
(vi) Time taken by an athlete to complete 100 meters race is measured in minutes.
(vii) Kerosene oil measured in litres.
(viii) Coal measured in quintal.
(ix) Day temperature measured in Celsius.
(x) Area of a mango leaf measured in Cm^2

Concept II

1. Meter 2. Kg. 3. Second 4. Celsius 5. Uniformity 6. C 7. A 8. D 9. B 10. B
11. For the sake of uniformity. Length of a room measured in meters and feet will give different measures. Mass of a body measured in pounds or kilograms will give different answers.
12. The weight of gold ear-rings cannot be measured in Kg. A smaller unit like grams is needed. Similarly, distance between two cities is expressed in kilometres; because if expressed in meters, the number would be unmanageable.

Concept III

1. blocks and meter scale 2. measuring stand 3. measuring tape 4. kilometers 5. scaled ruler 6. 1000

7. ofs Cms. and numbers 8. millimeters 9. 100 Cms. 10. A 11. C 12. A 13. D 14. B 15. D 16. C 17. D 18. A 19. A

Concept IV

1. breadth 2. meter² 3. litres 4. breadth x height 5. Cm³ 6. 1000 7. measuring cylinder 8. A 9. B 10. using a graph paper

11. (i) The graduated cylinder should bear signs of cm. and numbers.
 (ii) The Eye should be in level with the lowermost point of the curved surface of the liquid.
 (iii) Read lower level of liquid.

12. The space available in a container is called its capacity.

13. Measuring cylinder may be used to find the volume of a cork.

- a) Fill a measuring cylinder half with water. Note down the reading (x).
- b) Immerse cork into the cylinder with the help of a thread tied round it. Note down the reading y. () Difference (x-y) is the volume of cork.

Concept V

1. mass 2. mass 3. Kg. 4. 1000 5. 100 6. metric ton 7. Weights and Measures Department 8. horizontal 9. (i) C (ii) A (iii) D 10. D 11. C 12. A 13. A

14. (i) Fulcrum should be in the centre. (ii) Weights of pans should be equal.

15. (i) In preparation of medicines, components are mixed in fixed proportion. If components are not weighed accurately, we may not get the desired medicine and such a medicine may effect adversely.

(ii) Scientific experiments would give unreliable results if measurements are not accurate.

Concept VI

1. C 2. D 3. C 4. D 5. B 6. A 7. C 8. C 9. A 10. B 11. (i) c (ii) a (iii) b (iv) d (v) e 12. (i) b (ii) c (iii) a (iv) d

13. Description of method.

Precautions

- (i) Bulb of the thermometer should not be touched with hand.
- ii) Thermometer should be kept horizontal.
- (iii) Bring mercury level below hand before using it.

14. Diagram of oven thermometer and laboratory thermometer.

Concept VII

1. C 2. D 3. A 4. C 5. B 6. C 7. C 8. B 9. One. 10. 3600 11. one 12. 1440 13. 8760 14. time period
15. heart beat 16. balance wheel 17. periodic 18. periodic motion 19. student record.

Unit V**Concept I**

1. melting of ice, burning of papers, rainfall, change of milk into curd, ripening of fruits, breaking of glass, dissolution of sugar into water, setting of sun, stretching of string, heating of iron. 2. a) Water
b) Ash. c) composition. d) size. e) size. 3. a) (iii) b) (i) c) (v) d) (iv) (e) (ii)

Concept II

1. B
2. *Slow changes* (i) formation of curd, (ii) formation of cloud, (iii) ripening of fruits, (iv) formation of day and night (v) germination of seed.
Fast changes (i) burning of paper (ii) breaking of glass (iii) burning of match-stick (iv) burning of fuel, (v) train accident.
3. (a) fast. (b) slow. (c) slow. (d) slow. (e) fast. (f) fast. (g) fast. (h) fast. (i) fast.
4. (a) it forms an organic fertilizer. (b) it disturbs balance in nature. (c) it leads to atmospheric pollution. (d) it completes water cycle. (e) it causes soil erosion and destruction.
5. (i) Raining is desirable but becomes undesirable when in excess. (ii) Souring of milk is desirable for converting it into cheese but is undesirable otherwise. (iii) Burning of fuel is desirable for cooking but is undesirable when making preparations for cooking

6. D 7. B

8. Periodic changes

(i) Formation of day and night. (ii) Change of season (iii) Heartbeat (iv) Revolving of earth (v) Oscillation of clock pendulum.

9. (a) Irreversible. (b) Reversible (c) Reversible (d) Irreversible (e) Irreversible (f) Irreversible (g) Reversible (h) Irreversible (i) Irreversible (j) Irreversible

10. Reversible changes: melting of ice, melting of wax, stretching of spring, boiling of water, raining. Irreversible changes : rusting of iron, ripening of fruits, ageing, souring of milk, breaking of glass.

11. B 12. C 13. C 14. B

15. (a) a new compound is formed. (b) electrical energy changes into mechanical energy. (c) quicklime changes into slacked lime. (d) paper changes into ash. (e) properties of water are different from that of H_2 and O_2 (f) properties of filament do not change. (g) physical (h) chemical (i) chemical change.

16. (a) (ii) (b) (i) (c) (iv) (d) (iii) 17. C

18. (a) energy is absorbed (b) energy is evolved (c) energy is evolved (d) energy is evolved (e) energy is evolved

Concepts III and IV

1. (a) Chemical energy. (b) Electrical energy. (c) Muscular energy. (d) Sound energy. (e) Electrical and light energy.

2. (a) wax, oxygen (b) wood, axe (c) ice, source of heat (d) knife and fruit (e) magnets and armature.

3. (a) False (b) False (c) False (d) False (e) False (f) True

4. (a) When water is added to quicklime heat is evolved and a chemical change takes place. Reactants interact to form a new substance. (b) Food is cooked only when heat energy is provided. (c) When salt is dissolved in water, physical change takes place because properties of water and salt do not change. (d) Some undesirable changes such as rusting of iron, spoiling of food, souring of milk etc. can be avoided if necessary precautions are taken. (e) Energy is always required for a change. Electric bulb glows with the help of electrical energy.

5. (a) fast, irreversible, chemical (b) fast, reversible, physical (c) fast, reversible, physical (d) fast, reversible, physical (e) fast, irreversible, physical
6. Student record

Unit VI

Concept I

1. D 2. C 3. C 4. A 5. D 6. C 7. D 8. C 9. (a) (iii) (b) (iv) (c) (ii) (d) (iv) (e) (i)
10. When a body moves with respect to its surroundings, it is said to be in motion.
Examples: moving car, a stone falling towards earth, running horse.

Concept II

1. A 2. A 3. B 4. A 5. C 6. B 7. C 8. B

Concept III

1. Closing a door, kicking a football, throwing a weight.
2. Opening a door, moving objects towards oneself, stretching a string
3. Kicking a ball changes speed of the ball, hitting a cricket ball changes its direction, pressing a tomato changes its shape.
4. A 5. A 6. A 7. B 8. A 9. C 10. C 11. B

Concept IV

1. C 2. B 3. A 4. A 5. B 6. B 7. A 8. A 9. C
10. (a) (iv) (b) (v) (c) (ii) (d) (i) (e) (iii)
11. walking, lifting, running, throwing ball, speaking.

12. Motor, magnetic needle, electric bell, separation of iron pieces from rubbish.
13. When small pieces of paper are rubbed against comb, the force produced is called electrostatic force. Electric bell functions because of magnetic force.
14. Due to decrease in friction.

Concept V

1. Rolling ball coming to rest, cycle stops when pedalling is stopped.
2. Grooves in tyres, spikes in the soles of shoes.
3. Rusting of parts of a machine, loosening of parts of machine (wear and tear)
4. B 5. C
6. (i) F (ii) T (iii) T (iv) T (v) T (vi) F (vii) T (viii) T (ix) F (x) T

Concept VI

1. Bicycle saves time; sewing machines stitches clothes in less time, pulleys help to move weight which can not be pulled manually, pair of tongs help to apply force at a convenient point.
2. Pulley, inclined plane.
3. Inclined plane, pulley, lever.
4. (a) (iii) (b) (iv) (c) (i) (d) (ii) 5. (D)

Concept VII

1. Forceps, knife, pulley, lever. 2. Sewing machine, flour mill, drilling machine, bicycle. 3. Figure. 4. (C) 5. (D) 6. (A) 7. (C) 8. (B) 9. (B) 10. (C) 11. (D) 12. (D)

Concept VIII

1. Sewing machine, Bicycle. 2. Reduces friction, increases speed. 3. To avoid wear and tear, to keep free from dirt thus reducing friction. 4. Rusting. 5. Life, efficiency.

KEY TO QUESTIONS

UNIT VII

Concept I

1. Dog, Cat, Cow, Squirrel, Hen, Housefly, Pig, Horse, Camel, Donkey, Elephant, Monkey, Mosquito, Spider, Lizard, Cockroach, Ant, Bee, Earthworm, Parrot, Goat, Rat. (Any ten).
2. Fish, Crocodile, Seal, Dolphin, Alligator (Any two).
3. (a) *Plant eaters* : Cow, Goat, Elephant, Horse, Camel (any two).
(b) *Animal eaters* : Lion, Tiger, Leopard, Snake, Wall Lizard (any two).
4. *Plants that grow in pond* : Lotus, Water lilly, Vallisneria, Hydrilla (any two).
Plants that grow in soil : Neem, Peepal, Mango tree, Banana tree, Rose plant (any two).
5. *Living* : Gram seed, Bacteria, Sparrow, Amoeba, Whale, Mushroom, Ant, Hen.
Non-living : Feathers of Peacock, Wood
6. A 7. B 8. A and B 9. A and B 10. B

Concept II

1. (a) Semicircle (b) Triangle (c) Semicircle (d) Semicircle (e) Triangle
2. (i) (c) (ii) (b) (iii) (d) (iv) (e) (v) (a)
3. (i) (a) (ii) (b) (iii) (e) (iv) (b) (v) (b) 4. Ashok's Deodar 5. (a) Elliptical (b) Circular (c) Cylindrical
(d) Cylindrical (e) Elliptical (f) Rectangular

Concept III

1. Spider < Rat < Dog < Deer < Elephant.
2. Algae < Paddy < Sunflower < Coconut < Neem
3. Blue Whale 4. Amoeba, Paramoecium 5. D 6. C 7. A

Concept IV

1. Frog, Fish, Crocodile, Tiger, Peacock, Lion, Snake, Lizard, Cat (any other).
2. Parrot, Housefly, Sparrow.

3. *Herbivore* : Goat, Cow, Elephant, Deer. *Carnivores* : Cat, Dog, Lizard, Tiger, snake.
4. Photosynthesis, (Brief description).

Concept V

1. (a) Termil (b) Weaver bird (c) Lion (d) Owl (e) Spider (f) Fishes 2. (a) Soil (b) Hole (c) Sea (d) Cave (e) Soil (f) Nest 3. (i) Dog - Den (ii) Parrot - Cage (i) Earthworm - Soil (ii) Owl - Tree hole

Concept VI

1. Cow, Housefly, Butterfly, Sparrow. 2. Owl, Rat, Hyena 3. C 4. A 5. B 6. C

Concept VII

1. (a) Water, pond (b) Water, pond (c) Land (d) Pond (e) Hill slopes
2. (a) Water and Land (b) Water (c) Land (d) Cave (e) Air
3. C 4. C 5. A 6. C
7. Name - Characteristic
 - (i) Fish - Scales and fins.
 - (ii) Duck - Webbed climb; oily secretion on feathers, flatbeak.
 - (iii) Snail - Hard shell, Gillslits.
 - (iv) Kingfisher - Long neck, long beak.
 - (v) Whale - Blubber
8. *Habitat* - Dwelling places of living organisms where food is available, safe for them and their babies.
 - (i) Fish - Water (ii) Cactus - Dry places (iii) Waterlily - Water

Concept VIII

1. (a) Indian Tiger (b) Peacock (c) Human (d) Mango
2. (a) *Hibiscus rosa sinensis*. (b) form; habit (c) Genus ; species (d) Man (e) different ; and same genus.

Concept IX

1. Student record: May be evaluated for students observational skill, interest in plant/animal life.

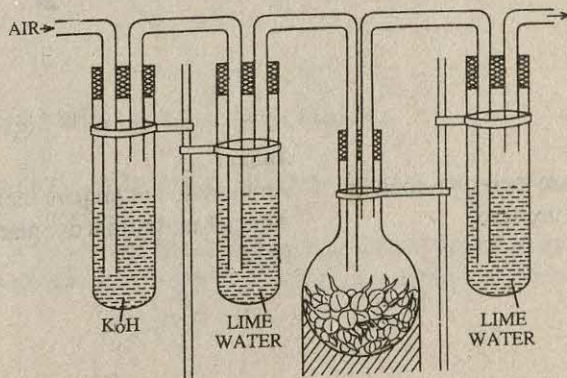
2. (i) Man, (60-70 years) (ii) Dog - (16-18 years) (iii) Housefly - (1-4 months) (iv) Spider - (20 years) (v) Squirrel - 8-9 years
3. (i) Wheat - 4 months (ii) Paddy - 4 months (iii) Eucalyptus tree - 200 yrs. (iv) Ashok tree - 60-70 yrs.

Concept X

1. Student record: Student record may be evaluated for his understanding of life processes and for his interest in living world.
2. B 3. A 4. C
5. (a) A banana tree is a living organism, therefore, it has the capacity to multiply whereas a dry wooden block is a dead organic matter.
- (b) Fish is unable to respire when taken out of water.
- (c) An uprooted tree is unable to get its water and food from soil and therefore dries up.
6. (i) Apparatus (ii) Method (iii) Observations (iv) Precautions.

Procedure :

Make air free from CO_2 by passing through KOH solution. Check that air is free from CO_2 by passing through lime water (lime water does not turn milky). CO_2 free air is passed in to a flask containing germinated gram seeds. Germinated gram seeds give out CO_2 which, then turns lime water milky.



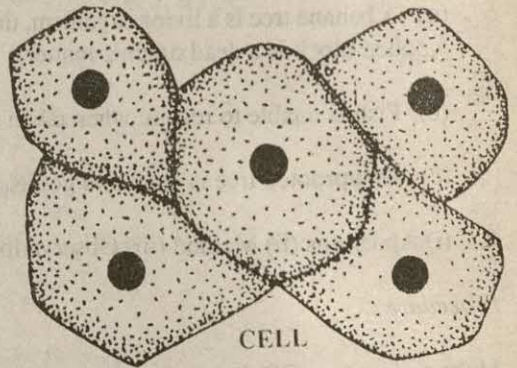
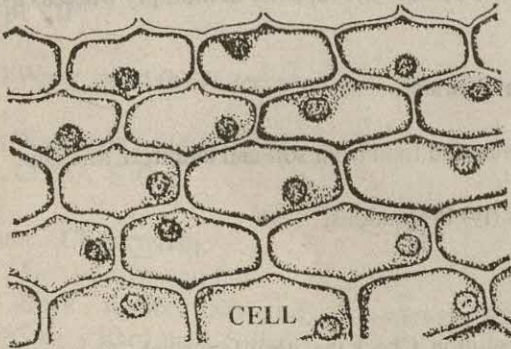
7. *Mimosa pudica* plant, touch with finger tip, leaflets close down.

or

Balsam plant with nature fruits. Touch tips of a fruit with finger. After few seconds, fruit splits, seeds disperse and valves of fruit roll up.

8. (i) Nutrition (ii) Growth (iii) Movements (iv) Reproduction (v) Response to external stimuli.

Concept XI



3. C, 4. D, 5. c.

Concept XII

1. A 2. A 3. A 4. D

5. *Plant*

- a) Plants prepare their own food.
- (2) Most plants are fixed

Animal

Animals do not prepare their food.
Animals move from one place to another in search of food

Concept XIII

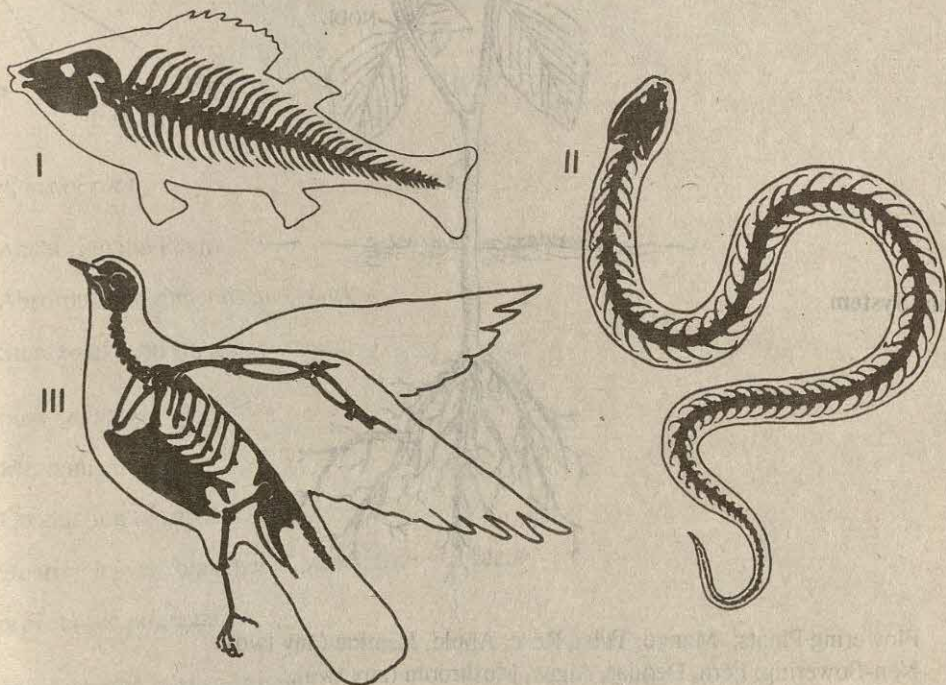
1. B 2. C 3. A 4. Vertebrates 5. Elephant 6. Coverings. 7. Feathers.

8. Vertebrates have a backbone whereas invertebrates have no backbone. Backbone is a part of the skeleton. Backbone is made up of several small bones called vertebrae.

Vertebrate : frog, rat, dog etc. (any one).

9. *Invertebrate* : Earthworm, Amoeba, Oyster, Insect (any one).

10.



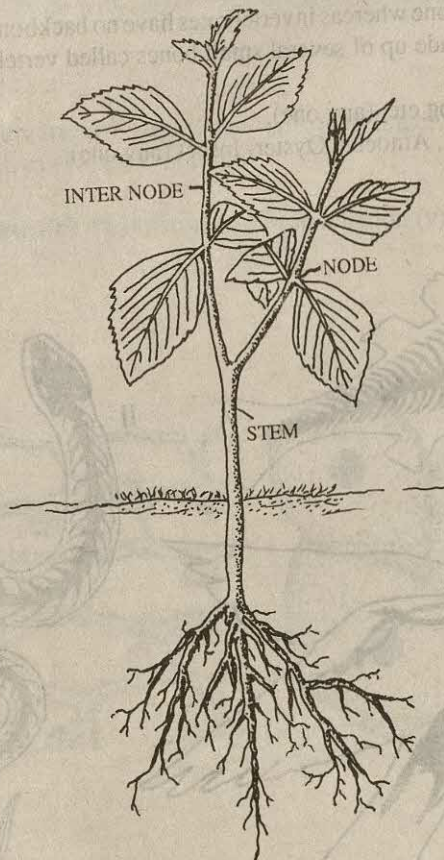
11. On the basis of body covering animals are classified as :

- (i) Hairy animals which have hair on skin such as man, rat, rabbit, dog, cat, cow, goat, deer, monkey, bear, donkey, horse etc.
- (ii) Scaly : animals which have scales on their body such as snakes, lizards, fishes.
- (iii) Feathery : animals which have feathers such as parrot, peacock, sparrow (all levels).

Concept XIV

1. A 2. D 3. A 4. A 5. C 6. Diagram

Shoot System



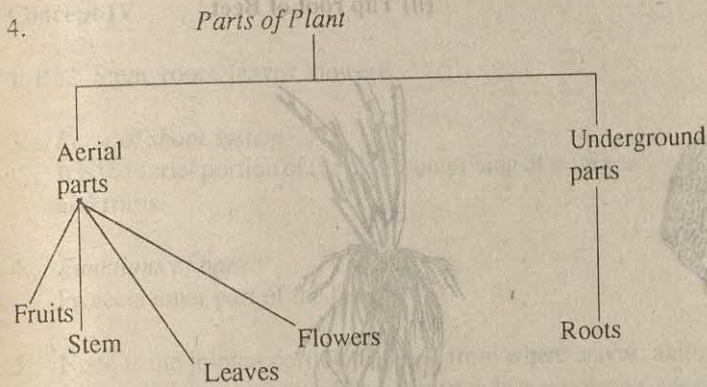
Root System

7. Flowering Plants: Mango, Tulsi, Rose, Apple, Jasmine (any two).
Non-flowering: Fern, Deodar, Algae, Mushroom (any two).
8. Herbs: Rice, Wheat, Maize, Chilli, Tulsi (any two).
Shrubs: China Rose, Ber, Mehdi, Rose, Guava, Lime (any two).
Trees: Mango, Peepal, Neem, Bel, Banyan (Any two).

Unit VIII

Concept I

1. B 2. D 3. D



5. *Functions of root*

- (i) Anchoring the Plant
- (ii) Absorption of minerals and water
- (iii) Storage of food (in special cases)

6. *Functions of stem*

- (i) Mechanical support.
- (ii) Conduction of sap and food
- (iii) Bearing leaves, branches, flowers, fruit and seeds.
- (iv) Vegetative propagation.
- (v) Food storage in special cases.

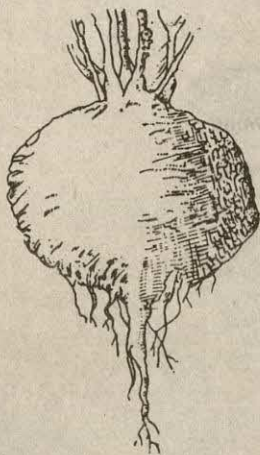
7. *Functions of leaves*

- (i) Food manufacture (Photosynthesis)
- (ii) Gaseous exchange.
- (iii) Food storage and vegetative propagation occasionally.

Concept II

1. C 2. D 3. A 4. Examples of tap root-Neen, Mango. Examples of fibrous roots — Wheat, Maize

5. (i) Fibrous root of Maize.



(ii) Tap root of Beet

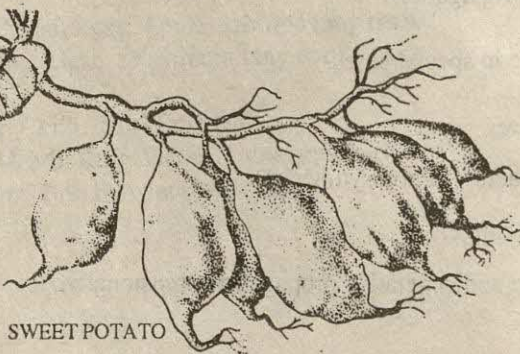


Concept III

1. A 2. B
3. Tap roots of turnip store food. This food is used by the plant when it needs.
4. Aerial roots borne on branches of banyan tree get fixed in soil to provide support to the tree.
5. Plants were not watered and therefore, plants did not get food.

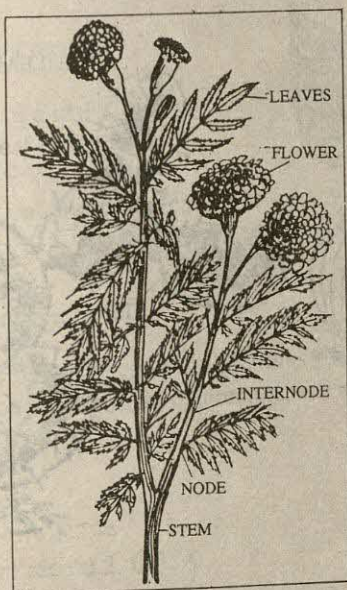
6. Tap root of Carrot

Roots of Sweet Potato



Concept IV

1. B 2. Stem, roots, leaves, flowers
3. *Parts of shoot system:*
It is the aerial portion of the plant comprising of stem bearing nodes, internodes, leaves, flowers and fruits.
4. *Functions of bark:*
Protects inner part of the tree.
5. Node is the jointed portion on stem, from where leaves, axillary bud, shoot emerge.
Internode is the portion of stem between two successive nodes.
- 6.



Concept V

1. C 2. a) Red ink, Blue ink b) To trace the path of conduction of water c) Xylem, Vessels

Concept VI

1. D 2. D 3. Underground, food 4. Scales and spines. 5. Underground stems grow in soil for storage and food material.

6. *Modified underground stems :*

Potato, Garlic, Colocasia, Onion, Ginger, (any three).

7. *Radish*

1. Modification of root
2. Adventitious root present

Potato

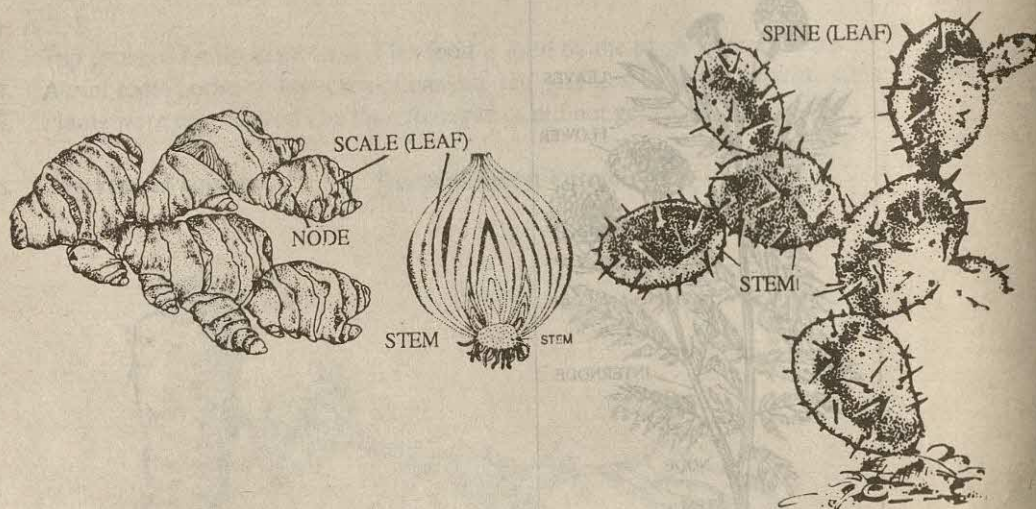
- Modification of stem
Nodes, buds, scaly leaves present

8. Ginger is regarded as underground stem because it has

- (i) nodes and internodes
- (ii) Scaly leaves on the nodes
- (iii) buds

9. Green, flat structure in cactus is not leaf, but is modified stem, because it has (i) nodes and internodes (ii) spiny leaves (iii) floral buds in the axile of spines

10.



Concept VII

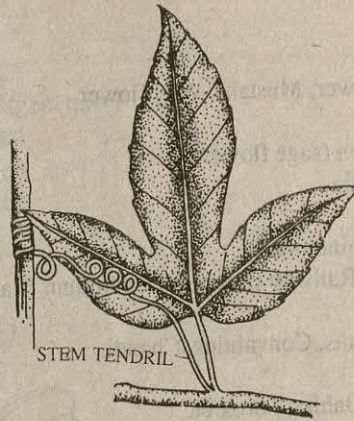
1. D 2. B

3. Stem tendrils — Cucurbit, Beans, Passion flower, Grape (any two)

Leaf tendrils — Pea, Sweet pea, Gloriosa, Bignonia (any two)

4. Function of tendril — helps plant to climb and provides support to plant.

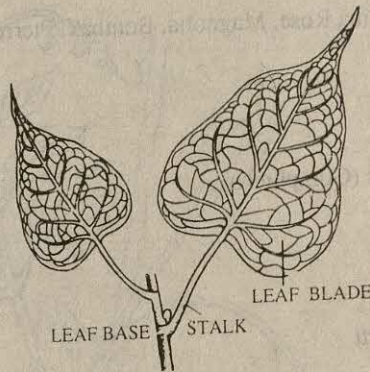
5.



6. Student Record

Concept VIII

1. Student record
2. Parts of a leaf
 - (i) leaf base
 - (ii) Petiole or stalk
 - (iii) Leaf lamina or leaf blade



Concept IX

1. C
2. Green pigment in plants is Chlorophyll.
3. The process of manufacturing food in the presence of sunlight by green leaves with the help of air (CO_2) and water is known as photosynthesis.

Concept X

1. Student record
2. C
3. A

4.
 - (i) various
 - (ii) shapes
 - (iii) different
 - (iv) smell
 - (v) without
 - (vi) not branches

5. (i) *Yellow flowers*
Marigold, Sunflower, Mustard, Wall flower
- (ii) *Red Flowers*
China Rose, Saliva (sage flower)
Carnation, Hearatia
- (iii) *Blue flowers*
Cornflower, Jecqeinontia
Ipomea palmate (Railway Creeper) Delphinium (Lark spur)
- (iv) *White flowers*
Jaśmine, Nyctanthus, Convalulus, Chandi.
- (v) *Mixed flowers*
Rose, Sweetpea, Dahlia, Phrox etc.
6. *Large flowers*
Lotus, Holyhock, China Rose, Magnolia, Bombax, Pterrocarpes, Passion flower
- Small flowers*
- (i) Amaranthus
- (ii) Chenopodium
- (iii) Polygenum
- (iv) Bechalar Buttons (Gomphrena)
- (v) Lady lace
- (vi) Saunf

7. *Flowers with scent*

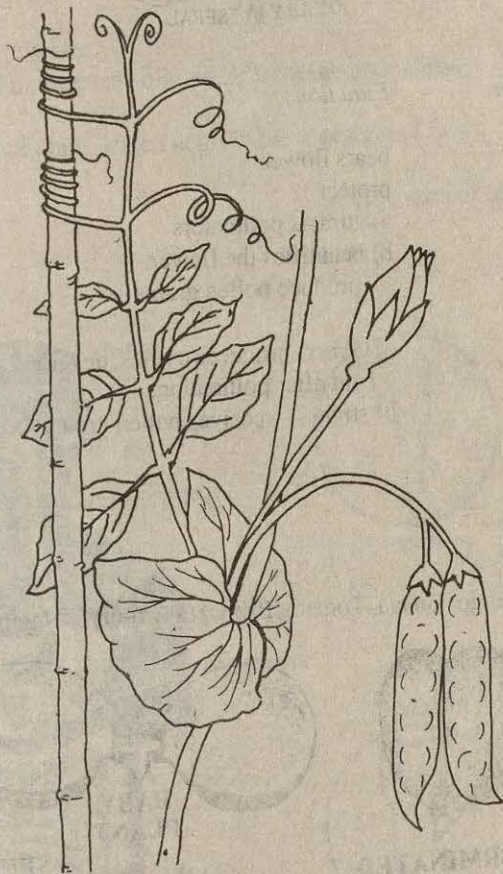
Name of the flowers	Colour
(i) Jasmine	white
(ii) Chameli	white
(iii) Champa	white
(iv) Mogra	white
(v) Nyctenthus	white
(vi) Murraye erotica	white
(vii) Rajnigandha (polyanthes)	white

8. *Flower with scent*

Name of the flower	Colour
(i) Bougainvella	mixed

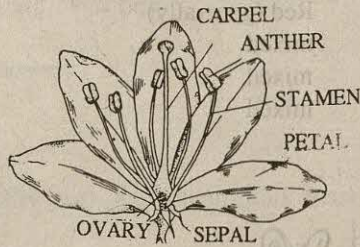
- | | |
|------------------|-----------------|
| (ii) Canna | mixed |
| (iii) China Rose | Red (generally) |
| (iv) Malvaviscus | mixed |
| (v) Sadabahar | mixed |
| (vi) Lotus | mixed |

9.



Concept XI

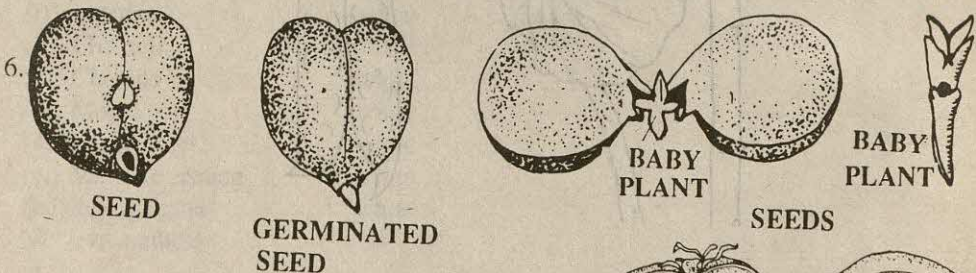
1. C 2. B 3. D 4. A 5. D 6. A 7. C 8. D 9. C 10. C

11. *Parts of a flower*12. *Parts of a flower**Function*

- | | |
|---------------------------|-----------------------------------------------------------------------------------------------------------|
| (i) Stalk (pedicel) | bears flowers |
| (ii) Sepals | protect |
| (iii) Petals | a) attracts pollinators
b) beautifies the flower. |
| (iv) Stamens
(anthers) | produce pollen grains |
| (v) Carpels | a) Ovary: produces ovules, develops into
fruit after pollination.
b) stigma—receives pollen grains. |

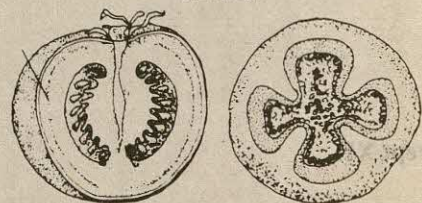
Concept XII

1. B 2. D 3. C 4. Apple, Mango, Guava, Tomato, Brinjal (any four) 5. Number of seeds by counting.



Concept XIII

1. C 2. D 3. A 4. C 5. B

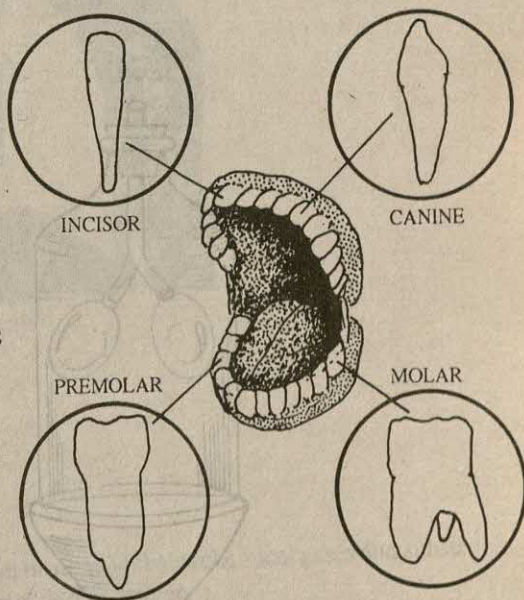
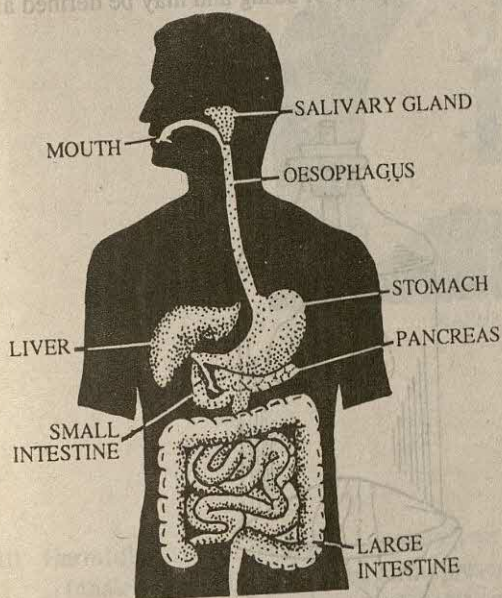


THALAMUS

KEY TO QUESTIONS

6. *Correct order*
- mouth
 - oesophagus
 - stomach
 - small intestine
 - large intestine
 - anus
7. Pancreas produces pancreatic juices which help in digestion.
8. i) Absorption of water.
ii) Removal of undigested solid waste from the body through the anus.
9. Liver produces bile, which helps in the digestion of fats.

11. Types of teeth (Diagram)



12. Functions of teeth

- i) Incisors - biting and cutting
- ii) Canines - tearing
- iii) Premolars - grinding and molars

13. Functions of tongue

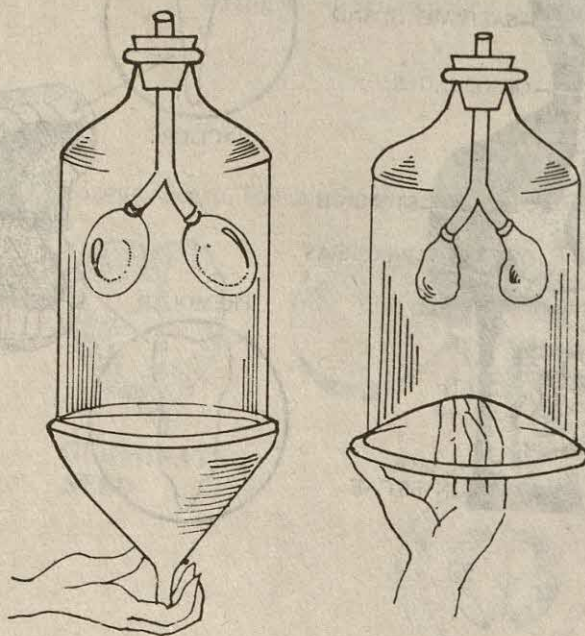
- (i) helps in mixing the saliva. (ii) movement of food within the buccal cavity. (iii) swallowing of food. (iv) taste of food. (v) essential for speaking.

Concept XIV

1. Student record 2. B 3. A 4. A 5. A 6. A 7. A

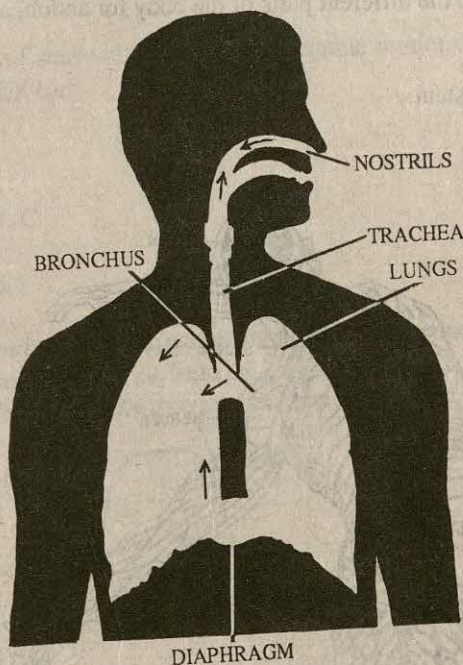
8. *Experiment*

A glass bottle with a glass tube and balloons may be treated as chest cavity and lungs. The bottom of the bottle is a thin rubber sheet which is tied with a piece of string and may be defined as



8. diaphragm in this experiment. Now pull the rubber sheet, that is, diaphragm, down. The space in the bottle increases and the balloons get inflated. On releasing the rubber sheet, the balloons get back to the normal size. The movement of diaphragm, thus helps in inhalation and exhalation of air.

9



10. Harmful effects of breathing in polluted air
i) Inhales more CO_2 . ii) Inhales germs present in air. iii) Inhales chemical gases and substances which are injurious to health. iv) Inhales air with less oxygen

Concept XV

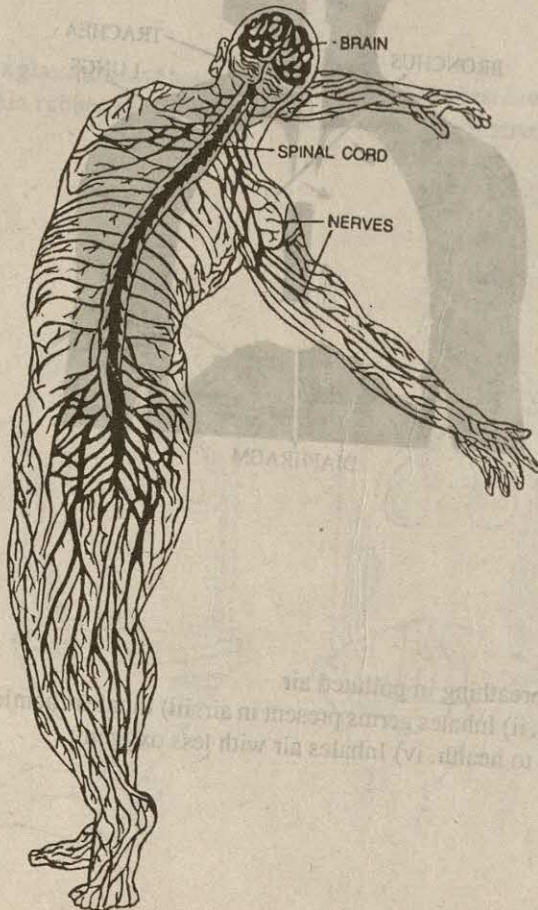
1. B 2. C 3. A 4. A

Concept XVI

1. A 2. D 3. C 4. D 5. A 6. D 7. B 8. C 9. A 10. By touch

11. The brain, the spinal cord, and the nerves are the main organs of the nervous system. The sensations are carried from the sense organs through nerves to the brain or spinal cord. On receiving a message the body's reaction to the changes is decided in the brain. The brain then sends out commands to the different parts of the body for action, again through nerves.

12. Diagram of nervous system.



KEY TO QUESTIONS

13. Comparison of nervous system with telephone cables system

Nervous system

- (i) messages go by electrical charge
- (ii) message sent is message received
- (iii) Transport channels are nerves

Telephone cable system

messages go by electromagnetic charge
 message sent is message received
 transport channels are metallic wires

14. Snakes react to the music of snake charmer due to rhythmic motions of charmer and not by music or sound. Snakes lack ears.

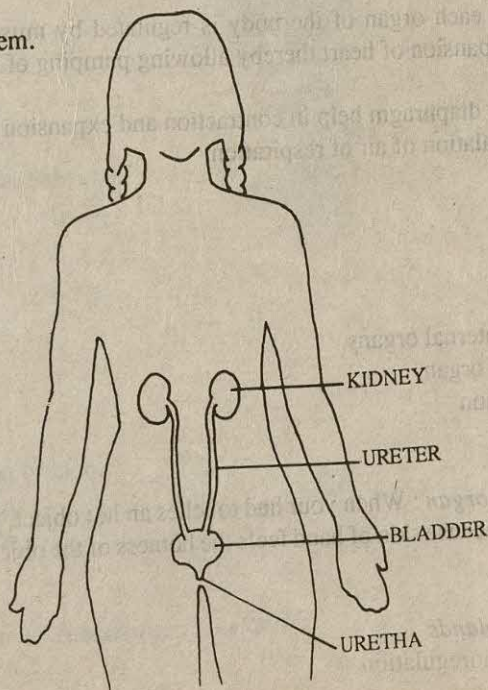
Concept XVII

1. B 2. A 3. B 4. B 5. A 6. D 7. C

8. Functions of urinary system

The function of the kidneys is to filter the wastes from the blood producing the yellowish liquid called urine. The ureters convey the urine from the kidneys to the bladder. Urine is stored in the bladder. It is passed out from the body through the urethra.

9. Diagram of urinary system.



Concept XVIII

1. Hen, Wall lizard, Snakes (all birds, all fishes)
2. The process of producing individuals of one's own kind is called reproduction.
3. If there is no reproduction in the living beings, the number of individuals in each group will not increase. A time will come when all the living groups will disappear from the world. Hence the process of reproduction is very important.
4.
 - a) reproduction
 - b) young ones of their own kind
 - c) male, female

Concept XIX

1.
 - a) helps in movement
 - b) helps in locomotion
2. The movement of each organ of the body is regulated by muscles. Heart muscles help in contraction and expansion of heart thereby allowing pumping of blood by heart.

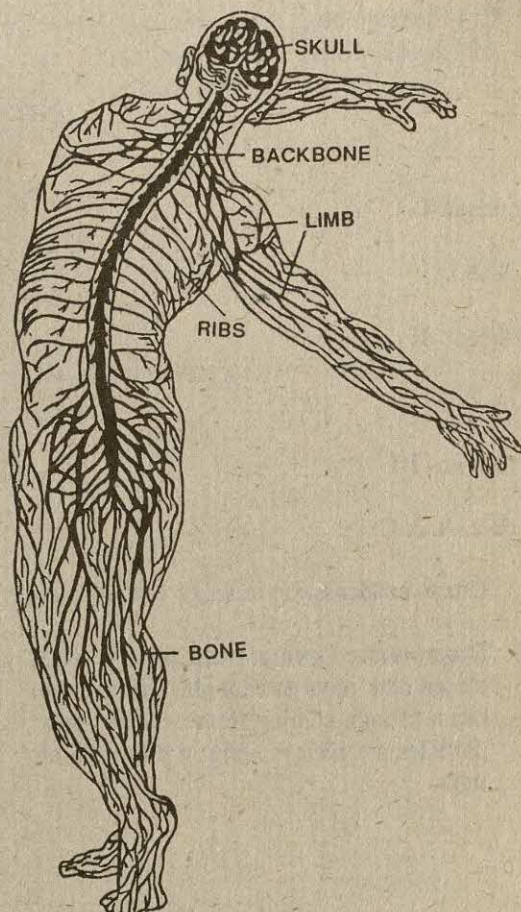
The muscles of the diaphragm help in contraction and expansion of lungs thereby permitting inhalation and exhalation of air of respiration.

Concept XX

1. Functions of skin :
 - a) Protection to internal organs.
 - b) Acts as a sense organ
 - c) Thermoregulation
 - d) Excretion
2. *Skin acts as a sense organ* : When your hand touches a hot object, you immediately withdraw your hand. This is because skin of hand feels the hotness of the object. Skin acts as sense organ for touch.
3. *Functions of sweat glands*
 - a) excretion
 - b) thermoregulation

Concept XXI

1. Organs of Skeletal system
 - a) Bones b) Muscles
2. *Functions of Skeletal system*
 - a) Support
 - b) Protection
 - c) Locomotion
 - d) Gives shape to the body
3. **Diagram** showing the position of skull, backbone, ribs and limb bones in man.

**Concept XXII**

1. B 2. A 3. B

4. *Functions of organs of locomotion*
 - a) legs — walking
 - b) wings — flying
 - c) fins — swimming
5. Organs of locomotion
 - a) deer, dog — legs
 - b) parrot — wings
6.
 - i) Heart — Circulation of blood
 - ii) Lung — Respiration
 - iii) Kidney — Excretion
7. All the organs of body must function properly for
 - i) Proper co-ordination

- ii) life to go on
- iii) good health

UNIT IX

Concept I

1. A 2. D

Concept II

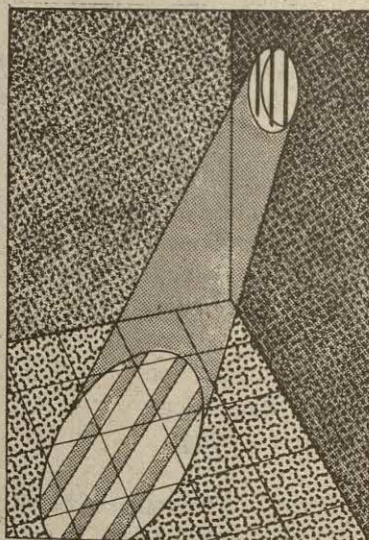
1. A 2. D

Concept - III

1. B 2. A. 3. C

4. Due to condensation of water vapour in winter.

5. *Experiment* : Open a small window in a closed dark room to sunlight. Observe the beam of light coming from window. Dust particles are seen moving in the beam of light.



6. Experiment to show that air contains Nitrogen.

Take a glass trough. Fill it about one-third with water. Dissolve one teaspoonful of caustic soda.(Sodium hydroxide) in water. Add a few drops of ink. Now fix a candle on a metallic or stone block. Place this block in the trough. Cover the lighted candle with a gas jar. Within a short time, the candle stops burning and the coloured water rises up in the jar. The oxygen of the air

is converted into carbon dioxide due to burning of candle. The carbon dioxide is absorbed by the caustic soda solution and water rises to fill up this vacuum. Still a major portion of the jar contains a gas which does not support burning of candle. This gas is nitrogen as it does not support burning and also does not dissolve in caustic soda.

7. Add lime water to jars A, B and C. Lime water turns milky in one of these jars and this jar contains carbon dioxide.

Concept IV

1. C
2. Take a burning splinter into each of these jars A, B and C. Splinter continues burning in jars containing oxygen.
3. Sufficient air is not available.
4. Air is not available.

Concept V

1. A 2. D 3. B 4. D 5. C

Concept VI

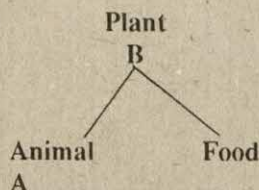
1. D. 2. C 3. A

Concept VII

1. C 2. D 3. C 4. B 5. D

6. Carbon dioxide, chlorophyll, water, sunlight.
7. All the smoke from chimneys will mix up with the air around factory and will pollute this surrounding environment to the maximum. Longer the height of chimney, wider is the spread of smoke and the concentration of pollutants is less.
8. In summer, humidity in air is less and therefore, evaporation is quicker.
9. Husk is lighter and air blows it away from you.

10.



11. Checklist for an experiment to show that air contains Nitrogen

- | | Yes | No |
|----|-----|----|
| 1. | | |
| 2. | ✓ | |
| 3. | ✓ | |
| 4. | ✓ | |

Unit X

Concept I

1. essential 2. seventy 3. water 4. quicker 5. dry up
6. Plants require water for preparation of food. If not watered regularly, plants cannot prepare food and therefore dry up.

7. During diarrhoea, loss of water takes place in child's body. He is advised to take more liquid food to make up for this lost percentage of water.
8. The halwai should select dry woods because fresh woods contain water. On heating water comes out of fresh woods and these do not burn easily.
9. By squeezing a plant, we get a liquid substance which contains high percentage of water or plants contain water and lose a small part of it by transpiration. Cover a potted plant by a dry jar. After sometime, water droplets are seen in the jar.
10. Experiment: Take a potted plant and do not water it for several days. The plant dies as it cannot carry out life processes in the absence of water. Similarly, if an animal is not allowed to drink water for few days, it dies.

Concept II

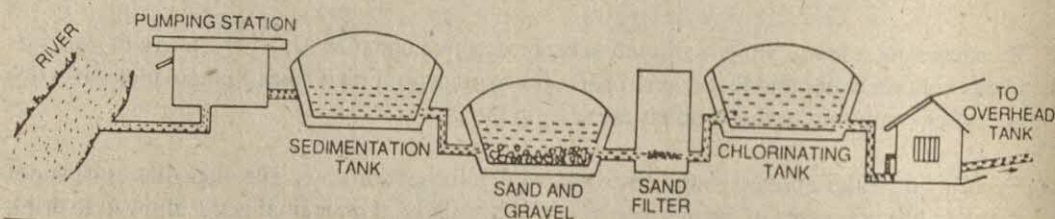
1. D 2. B 3. D 4. C 5. D

6. River water can be made fit for drinking by boiling, filtering and then treating it with potassium permanganate.
7. Sea water is saline, that is, it contains dissolved salts, and therefore, it can not be used for agriculture.
8. Pond water contains germs, impurities.
9. Oceans, rivers, lakes, ponds, wells, spring, rain, snow.
10. Sea water is saline and contains dissolved salts which cannot be easily removed. River water contains impurities and germs. These impurities can be removed by boiling and filtering. This water can be used at home after purification.

Concept III

1. C 2. A 3. C 4. D 5. D

6. Diagram



7. Epidemic generally spreads due to unsafe (contaminated) drinking water. This water contains germs, (bacteria) which spread diseases. Therefore, it is advised to boil water to remove the germs.

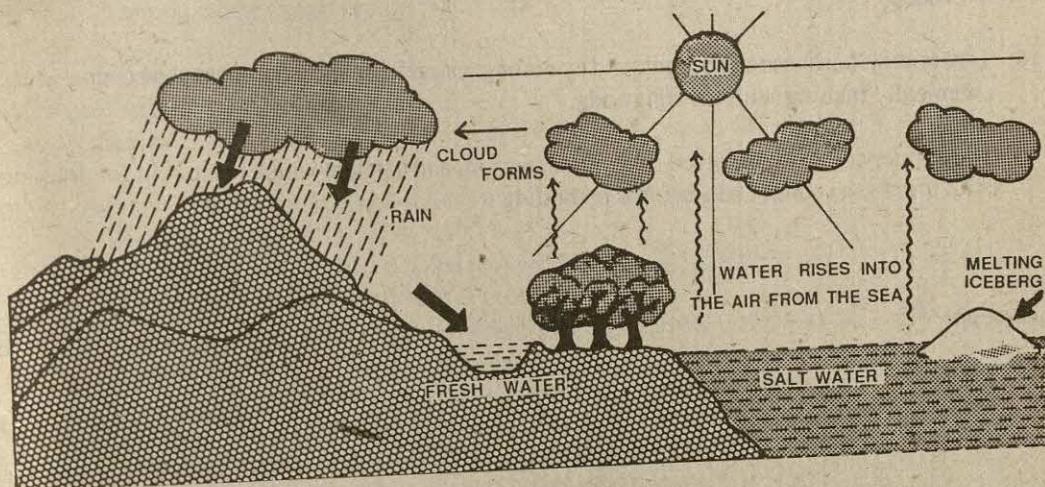
Concept IV

1. C 2. D 3. A 4. B 5. C 6. D 7. D 8. D 9. Zero; 100 10. three; solid; liquid; gas. 11. 100 12. 100; condensation 13. 0; freezing 14. 0; meeting 15. dissolves. 16. water evaporates in summer.
17. Boil water to remove its dissolved oxygen. Now cover and allow this water to cool. Put some alive fishes and aquatic plants in this water. These fishes and plants die due to lack of dissolved air.
18. Water soluble substances: Sugar; Common Salt; Milk; Alcohol; Oxygen.
Water insoluble substances: Sand; Marble pieces; Kerosene; Vegetable oil; Nitrogen.

Concept V

1. evaporation; condensation. 2. rivers. 3. absorbs. 4. different states of water, 5. sun
6. The sun warms water in oceans, ponds, lakes and rivers. Water from these sources evaporates into air continuously. These water vapours cool at higher altitudes forming clouds. Clouds come together and fall as rains. If air cools to a greater extent, the water droplets freeze into snow particles which continue to form snow flakes which fall as snow in colder regions. When snow melts, water flows into streams and rivers. Many of these rivers fall into the ocean. Most of the water falling in the form of rain also reaches sea through streams and rivers.

7. Water Cycle



8. Rain water falls into ocean. Sun warms ocean water and the water vapours so formed rise up. At high altitude, these condense to form clouds. When clouds come together, they form drops of water which fall as rains.
9. Large sea surrounds Kerala. Sea water evaporates and then condenses to form rain. In Rajasthan there is no such sea or a big source of water and therefore less of rains
10. Process of cloud formation
Experiment: Take some amount of water in an aluminium kettle. Heat the kettle till water starts boiling. Water vapours coming out of kettle condense to form water drops, when these fall on plate. This process is followed in the formation of clouds.

Concept VI

1. river 2. sea 3. washing soda 4. hardness 5. drinking; cooking 6. chlorides; sulphates of calcium and magnesium 7. dust germs. 8. salty 9. fit 10. salts
11. salts dissolved in water, on heating deposit as white coating on the immersion rod.

12. Add small quantity of soap to both the samples of water. Sample of water that produces lather is river water.
13. Hard water contains dissolved salts and does not form lather with soap. Soft water forms lather with soap.
14. Temporary hardness can be removed by boiling water. Permanent hardness can be removed by chemically treating with washing soda.
15. Hard water contains dissolved salts of magnesium and calcium which make it fit for drinking. And these salts cannot be removed by boiling.

Concept VII

1. (i) Drinking (ii) Cooking (iii) Bathing (iv) Washing clothes (v) Agriculture
2. Water is essential for life activities. Therefore, all animals drink water. This water is lost in various ways, such as, urinating, sweating, exhalation etc. To remain alive, an animal must make up this loss of water.
3. Plants prepare their food with the help of water and carbon dioxide in presence of sun. Therefore, water is essential for preparation of food. Seeds of several plants are transported by water.
4. Diseases that can be spread through water are diarrhoea, typhoid and jaundice.
5. Garbage, animal dung, rotten plant and dead animals etc., should not be thrown or collected near water source such as well, river, pond etc. In case epidemic spreads, drinking water should be boiled and filtered.
6. Water also provides recreation, and sports facilities, such as swimming, boating or water skiing
7. Animals — fish, snail. Plants — Hydrilla, algae.
8. Ships and boats, transport people, material etc., flowing water in rivers is used to transport timber (logs of wood).

Concept VIII

1. (i) Bathing animals in pond, lake, river.
(ii) Throwing animal dung, rotten plants near water source.
(iii) Washing clothes near well, in ponds, lakes.
2. (i) Industrial waste going to rivers.
(ii) Domestic wastage going to rivers.
(iii) Because of less trees, soil is carried to river by rain.
3. (i) By avoiding direct disposal of household waste into source of water such as river, lake or pond.
(ii) By avoiding washing of cloth and utensils near source of water.
(iii) By avoiding bathing of animals in ponds, lakes etc.
(iv) By not throwing animal dung and rotten plants near water resources.
(v) By covering wells.
4. (i) Industrial wastes should not be directly disposed of in rivers.
(ii) Domestic wastes should not be directly disposed of in rivers.
(iii) Sewage pipes should not be connected to or near to source of water.
(iv) Garbage should not be collected near water source.
5. Polluted water is contaminated with germs and bacteria and is therefore unsafe for drinking and cooking purposes. It spreads diseases and a large number of people die when epidemic spreads due to polluted water. Also, industrial wastes leave different chemicals in water which are harmful for man, animals and also plants.

Concept IX

1. D 2. C 3. B 4. A 5. A
6. Forests increase rainfall. (Brief explanation).
7. (i) By not washing clothes and bathing animals, in potable water.
(ii) By not using potable water for agriculture purposes.
8. Sea water is hard and cannot be used for domestic, agriculture and industrial use. We mainly depend on river water. Therefore it is necessary to save water.
9. Dams help in overcoming scarcity of water (Brief explanation).

Unit XII

Concept I

1. Lifting weight to a height; climbing up a staircase; eating food; burning fuel, playing football.
2.
 - a) Muscular energy into mechanical energy.
 - b) Muscular energy into mechanical energy.
 - c) Muscular energy into mechanical energy.
 - d) Chemical energy into heat energy.
3.
 - i) When a body is lifted through certain height, muscular energy is required.
 - ii) Pushing a door requires muscular energy.
4. A piece of stone once raised to a certain height and then released is capable of breaking a glass piece and hence possesses energy.
5. Stone of mass 100 gms. will do more work on falling because more energy was spent in raising it to the same height.
6. Shyam spent more energy as he had to move rice through a greater distance. Also Shyam did more work. More energy is required to do more work.

Concept II

1. A 2. A 3. A 4. D 5. A
6. Magnitude of two forces is same, since the distance through which the body is moved remains same in two cases.
7. When the body is moved through greater distance, more energy is spent and hence more work is done.

Concept III

1. B 2. A 3. C 4. B 5. B 6. C
7. Burning of fuel, Torch cell (any similar situation).
8. Electrical fan; electrical heater.
9. Uses of heat energy — boiling water; cooking.
Solar energy — solar cooker; solar cells
10. (a) (v)
(b) (i)
(c) (ii)
(d) (iii)

Concept IV

1. C
2. a) Toy rocket.
b) Burning of coal
c) Torch cell
3. a) Rubbing of hands.
b) Steam engine
4. i) by using battery
ii) by using electrical power main
5. i) When a musical instrument is played such as guitar, vibrations in string produce sound.
(ii) In microphone, sound produces vibrations on ear drum.

Concept V

1. B 2. A 3. B 4. C 5. A 6. A 7. A 8. A 9. C 10. A

11. Fossil fuels: Coal, Petroleum. Non-fossil fuels: Wood, Charcoal
12. Petrol, Diesel and Kerosene.
13. (i) Chemical energy to heat energy.
(ii) Heat energy to mechanical energy.
(iii) Mechanical energy to electrical energy.
Fuel burns to produce heat. Heating water produces steam, which rotates the turbine.
Rotating turbines produce electricity.
14. Plants depend on solar energy; without which these cannot prepare their food. Animals depend on plants for food, clothing, shelter etc.
15. Fossil fuels are present in nature in limited amount. These are non-reversible.

Concept VI

1. C 2. D
3. Renewable source of energy can be used again and again where as non-renewable source of energy can not be used again.
4. Water; Wind.
5. Coal; Petroleum

UNIT XII

Concept I

1. B 2. D 3. C 4. D 5. A 6. C 7. B 8. C 9. B 10. D
11. (i) b (ii) c, a (iii) e (iv) d (v) a
12. (i) e (ii) c (iii) b (iv) a (v) d

13. Plants produce food, which is used by animals. Plants enter our economic system as 'producers', Animals consume these substances (food etc.) and hence consumers.

14. (i) Herbivorous: eat plants and plant products.

(ii) Eat animals.

(iii) Eat both plants and animals.

15.	<i>Herbivorous</i>	<i>Carnivorous</i>	<i>Omnivorous</i>
(i)	Cow	Lion	Man
(ii)	Horse	Tiger	Ant
(iii)	Camel	Leopard	Sparrow
(iv)	Elephant	Fox	Crow
(v)	Goat	Vulture	Dog
(vi)	Sheep	Snake	Mynah
(vii)	Rabbit	Mongoose	Cat
(viii)	Donkey	Wall lizard	Pig
(ix)	Monkey	Kingfisher	Housefly
(x)	Parrot	Frog.	

16. *Uses of Plants*

Source of food; timber; fuel; fodder for pet animals; oxygenators; fossil fuel; dye; tannin; gums etc.

17. Plants help in maintaining balance in nature via water cycle, soil conservation, oxygenation.

18. *Uses of animals to plant life.*

- (i) As agents of dispersal of fruits, seeds etc.
- (ii) As pollinators.
- (iii) Food for carnivorous plants.
- (iv) Source of nitrogen (animal waste as manure).
- (v) Source of carbon and ultimately carbon dioxide.

19. *Destroying Plants* disturbs soil conservation; water cycle; atmosphere; animal life.

Destroying Animals disturbs ecosystems; disturbs plant life because there is no carbon dioxide available for plants; no help in pollination; no dissemination of plant products.

20. *Role of Man in protecting Plant and Animal life. Conservational activities:*

- i. Assessing threat on different species.
- ii. Preventing exploitation of extinct and rare species.
- iii. Conserving such species by making sanctuaries, reserves etc.
- iv. Making laws for saving such species.

Concept II

1. B. 2. C. 3. B. 4. D. 5. D.

6. *Transfer of energy from Sun to Plants.*

Sun

Sun solar energy

Plants absorb solar energy with the help of chlorophyll pigment. This energy is stored in the manufactured food during the process of photosynthesis.

↓

Plant absorption of solar energy.

Transfer of energy from plants to Animals.

Photosynthesis

When animals feed on plants, they obtain stored energy and use it in various functions.

↓

Food Products
Stored Energy

↓

Food

↓

Animals

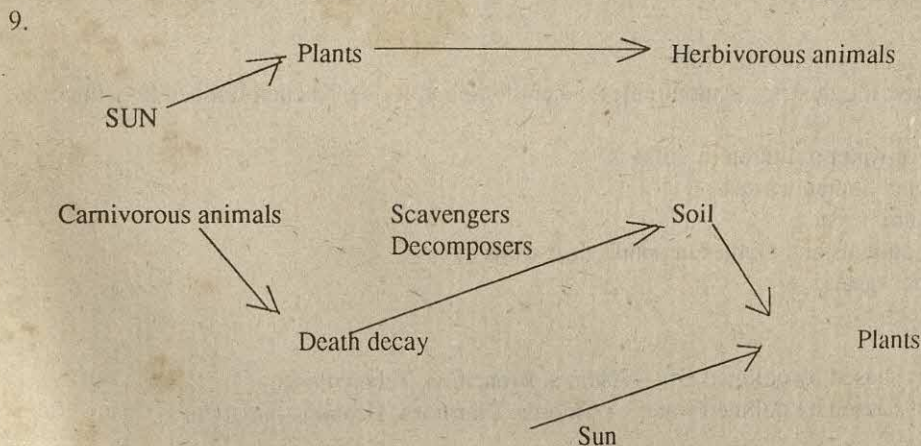
Energy for activities.

7. **Food Chains**

- (i) Grass - Goat - Man.
- (ii) Plant - Insect - Frog - Snake - Peacock.
- (iii) Grass - Rabbit - Lion.

8. **Role of Decomposer**

Decomposers help in the process of decomposition of dead animals and plants. They are mostly bacteria which decompose the dead organic material into simple compounds. Thus, the matter returns to the soil.



Concept III

1. In nature, living and non-living things are interdependent and keep check on each other. Among living beings, animals and plants are interdependent on each other. This whole process results in a balance which exists in nature.
2. (i) For survival of life.
(ii) For proper functioning of different cycles in nature.
3. Plants and animals balance each other's activities by:
 - (i) Maintaining proper food chains existing between them.
 - (ii) Plants supply oxygen for animals and animals supply carbon dioxide for use by plants.
 - (iii) Animal wastes are used by plants as manures etc.
4. Human activities that disturb balance in nature.
 - (i) Cutting of forest trees for his own use as fuel, timber etc., which increases soil erosion, reduces rainfalls and disturbs oxygen concentration in air.
 - (ii) Industrialization and improper disposal of industrial wastes, affects balance of various components in air, water and living species of plants and animals.
 - (iii) Improper disposal of human wastes causes imbalance in nature.

Concept IV

1. C. 2. A. 3. B. 4. A. 5. B.
6. Sources of air pollution in cities.
Locomotives, Industries, Automobiles, Scientific laboratories, Kitchen furnace (any three)
7. Sources of water pollution in villages
Animal and human wastes.
Agricultural wastes.
Bathing animals and clothes in ponds, near wells etc.
Domestic wastes.
(any three)
8. Diseases caused by polluted air — Asthma, Bronchitis, Tuberculosis.
Diseases caused by polluted water — Chlorea, Diarrhoea, Hepatitis (any two).
9. Various kinds of pollutions cause imbalance in nature. Air, water, soil, which are essential for living organisms, get polluted by various human activities. Factories and houses burn gas, coal and oil. The fuels produce smoke, which contains harmful gases and fine particles. These are harmful to life of both plants and animals. When diseases destroy life, the balance in nature is disturbed. Similarly, water pollution is harmful for life, spreads various diseases. Again destruction of life causes imbalance in nature.

UNIT XIII**Concept I**

1. C 2. D 3. A 4. D 5. B
6. Stars, Galaxy.
7. Milky way, North to South.
8. Moon, Venus, Star, Pole Star (any three).



